PB82-192097

Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvement: Sites L1-L7 (Data Supplement)

Pennsylvania State Univ., University Park

Prepared for

American Boiler Manufacturers Association
Arlington, VA

Apr 81

U.S. Department of Commerce
National Technical Information Service
NTIS.

ABMA	American Boiler Manufacturers Association	1500 Wilson Boulevard Arlington VA 22209	PB82-192097
DoE	United States Department of Energy	Division of Power Systems Energy Technology Branch Washington DC 20545	
EPA	United States Environmental Protection Agency	Industrial Environmental Research Laboratory Research Triangle Park NC 27711	EPA-600/7-81-020b April 1981

Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement — Sites L1-L7 (Data Supplement)

Interagency Energy/Environment R&D Program Report

REPRODUCED BY
NATIONAL TECHNICAL
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U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA 22161

IMPACTOR DATA SHEET

Site Desig. L1 Date 4/20/78

Sample Location Boiler Outlet Sample No. _____

P_b 28.94 Assmd Moisture 5% Noz. Dia. 3/8

Stk. Dia 36" Sample Point _____ Sample Time 22 MIN

Stat P -3.3 "H_2O Pitot Tube ΔP .275 "H_2O Stk T 365 °F

ΔH Orfice 3.05 "H_2O Liquid Col. 20 ml Sample Vol. 25.51 scf

D_p	Net Wt. (milligm)	Percent
125.0	64.18	100
45.0	29.45	70.63
30.0	28.758	59.15
20.0	42.38	48.65
9.15	15.21	33.47
5.65	11.91	28.81
3.80	8.06	23.75
2.55	5.43	20.43
1.60	4.13	17.97
.74	4.23	15.63
.40	4.96	13.28
.22	9.42	10.36
Total	228.14 Milligrms	

RESEARCH REPORTING SERIES

Research reports of the Office of Research and Development, U.S. Environmental Protection Agency, have been grouped into nine series. These nine broad categories were established to facilitate further development and application of environmental technology. Elimination of traditional grouping was consciously planned to foster technology transfer and a maximum interface in related fields. The nine series are:

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7. Interagency Energy-Environment Research and Development
8. "Special" Reports
9. Miscellaneous Reports

This report has been assigned to the INTERAGENCY ENERGY-ENVIRONMENT RESEARCH AND DEVELOPMENT series. Reports in this series result from the effort funded under the 17-agency Federal Energy/Environment Research and Development Program. These studies relate to EPA's mission to protect the public health and welfare from adverse effects of pollutants associated with energy systems. The goal of the Program is to assure the rapid development of domestic energy supplies in an environmentally-compatible manner by providing the necessary environmental data and control technology. Investigations include analyses of the transport of energy-related pollutants and their health and ecological effects; assessments of, and development of, control technologies for energy systems; and integrated assessments of a wide range of energy-related environmental issues.

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15. SUPPLEMENTARY NOTES IERL-RTP project officer is Robert E. Hall, Mail Drop 65, 919/541-2477. Data supplements are also available for Sites A-K.		

16. ABSTRACT The supplement is a compilation of test data presented in greater detail than was practical in the related final technical report (EPA-600/7-81-020a). It provides details to researchers who are interested in performing their own analyses. The final technical report gives objectives; describes facilities tested, coals fired, and test equipment; outlines procedures; and provides interpretations and conclusions. The supplement contains panel board data for each test, detailed particulate data, and particle size distribution data.

17. KEY WORDS AND DOCUMENT ANALYSIS			
a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Pollution Boilers Stokers Field Tests Coal Combustion	Emission Efficiency Dust Aerosols Particle Size Distribution	Pollution Control Stationary Sources Industrial Boilers Test Data Particulate	13B 14G 13A 11G 14B 07D 21D 21B
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April 1981

Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement — Sites L1-L7 (Data Supplement)

by

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IAG/Contract Nos. IAG-D7-E681FZ (EPA), EF-77-C-01-2609 (DoE)
Program Element No. EHE624

Project Officers: R.E. Hall (EPA) and W.T. Harvey, Jr. (DoE)

Industrial Environmental Research Laboratory
Office of Environmental Engineering and Technology
Research Triangle Park, NC 27711

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U.S. DEPARTMENT OF ENERGY
Division of Power Systems/Energy Technology Branch
Washington, DC 20545

and

AMERICAN BOILER MANUFACTURERS ASSOCIATION
1500 Wilson Boulevard
Arlington, VA 22209

FOREWORD

The purpose of this Data Supplement Volume is to document data in greater detail than was practical in the Final Technical Report.[1] It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations and conclusions. The Final Technical Report also contains data summaries not found in this volume.

The data in this volume are arranged by Test Sites, L1 through L7, and within each site by type (i.e., Particulate Field Data Sheets, Particulate Lab Worksheet, etc.). The boilers tested are referred to as Boiler L1 through L7 to correspond with the seven sites included in the Site L part of the program entitled, "A Testing Program to Update Equipment Specifications and Design Criteria for Stoker Fired Boilers."

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[1] J. W. Davis and H. K. Owens, "Field Tests of Institutional Stoker Coal-Fired Boilers for Emissions Control - Site L."

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CONVERSION FACTORS

ENGLISH AND METRIC UNITS TO SI UNITS

To Convert From	To	Multiply By
in	cm	2.540
in^2	cm^2	6.452
ft	m	0.3048
ft^2	m^2	0.09290
ft^3	m^3	0.02832
lb	Kg	0.4536
lb/hr	Mg/s	0.1260
$lb/10^6$BTU	ng/J	430
g/Mcal	ng/J	239
BTU	J	1054
BTU/lb	J/kg	2324
BTU/hr	W	0.2929
J/sec	W	1.000
J/hr	W	3600
BTU/ft/hr	W/m	0.9609
BTU/ft/hr	J/hr/m	3459
$BTU/ft^2/hr$	W/m^2	3.152
$BTU/ft^2/hr$	$J/hr/m^2$	11349
$BTU/ft^3/hr$	W/m^3	10.34
$BTU/ft^3/hr$	$J/hr/m^3$	37234
psia	Pa	6895
$"H_2O$	Pa	249.1
Rankine	Celsius	C = 5/9R-273
Fahrenheit	Celsius	C = 5/9(F-32)
Celsius	Kelvin	K = C+273
Rankine	Kelvin	K = 5/9R

CONVERSION FACTORS

SI UNITS TO ENGLISH AND METRIC UNITS

To Convert From	To	Multiply By
cm	in	0.3937
cm^2	in^2	0.1550
m	ft	3.281
m^2	ft^2	10.764
m^3	ft^3	35.315
Kg	lb	2.205
Mg/s	lb/hr	7.937
ng/J	$lb/10^6$BTU	0.00233
ng/J	g/Mcal	0.00418
J	BTU	0.000948
J/kg	BTU/lb	0.000430
J/hr/m	BTU/ft/hr	0.000289
$J/hr/m^2$	$BTU/ft^2/hr$	0.0000881
$J/hr/m^3$	$BTU/ft^3/hr$	0.0000269
W	BTU/hr	3.414
W	J/hr	0.000278
W/m	BTU/ft/hr	1.041
W/m^2	$BTU/ft^2/hr$	0.317
W/m^3	$BTU/ft^3/hr$	0.0967
Pa	psia	0.000145
Pa	$"H_2O$	0.004014
Kelvin	Fahrenheit	F = 1.8K-460
Celsius	Fahrenheit	F = 1.8C+32
Fahrenheit	Rankine	R = F+460
Kelvin	Rankine	R = 1.8K

SI PREFIXES

Multiplication Factor	Prefix	SI Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto*	h
10^{1}	deka*	da
10^{-1}	deci*	d
10^{-2}	centi*	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

*Not recommended but occasionally used

SECTION 1.0

SITE L1 DATA

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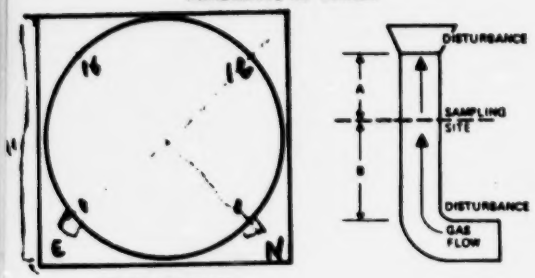
PARTICULATE FIELD DATA

U; Leak Test 0.019 @ 15" Hg

1/2

SCHEMATIC OF STACK



CROSS SECTION

Start 0830 - 9.50

PLANT L-1
DATE 4/20/78
LOCATION Roof
OPERATOR Davis Anderson
STACK NO. SLW
RUN NO. 1
SAMPLE BOX NO. RAC (old)
METER BOX NO. CAES

AMBIENT TEMPERATURE 48
BAROMETRIC PRESSURE 28.9
ASSUMED MOISTURE, % 5%
PROBE LENGTH, in. 60'
NOZZLE DIAMETER, in. 3/8"
STACK DIAMETER, in. 37 1/4
PROBE HEATER SETTING 250
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.8
C FACTOR 0.865
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	(2) STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER (1) INLET ($T_{m_{IN}}$), °F	(2) OUTLET ($T_{m_{OUT}}$), °F	(4) SAMPLE BOX TEMPERATURE °F	(5) TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
N-1	5	-.13	240*	0.37	.608	4.1	4.1	637.375	54 53	52	173	50	5"	
2	5	"	240*	.37	.608	4.1	4.1		72 63	54	222	58	5"	
3	5	"	540	.38	.616	4.1	4.1		79 68	57	252	66	6"	
4	5	"	546	.38	.616	4.1	4.1	653.20	87 74	61	267	78	6.	
5	5	"	537	.44	.663	4.7	4.7		94 80	66	271	83	7"	
6	5	.13	548	.45	.671	4.8	4.8		98 83	68	270	84	7"	
7	5	.13	560	.52	.721	5.5	5.5		98 84	70	273	83	7.2	
8	5	"	560	.50	.707	5.3	5.3		99 85	71	275	84	7.2	
9	5	"	560	.45	.671	4.8	4.8	681.68	90 81	72	235	72	6.3	
10	5	"	566	.53	.728	5.6	5.6		96 85	74	250	75	7.2	
11	5	"	560	.50	.707	5.3	5.3		101 89	77	257	74	7.0	
12	5	"	553	.40	.632	4.3	4.3		102 90	78	253	75	6.0	
13	5	"	553	.40	.632	4.3	4.3		103 91	79	249	76	6.0	
14	5	"	550	.38	.616	4.1	4.1		102 91	80	239	73	5.8	
15	5	"	548	.35	.592	3.8	3.8		101 91	81	233	70	5.0	
TOTAL 16	5	"	543	.35	.592	3.8	3.8	727.63	102 92	82	225	68	5.0	
AVERAGE	80		7724		10.38	72.7		90.255	1300		3444	116.7	18.7	

Actual 5 x -.13

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	87	181	44		258
INITIAL	100	100	0		200
LIQUID COLLECTED	-13	81	44		58

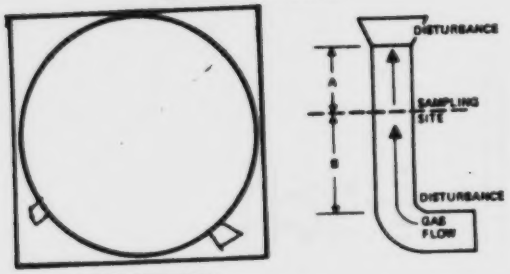
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2		10.0	9.0	0	81
3					

COMMENTS:

* Did not use in calculating Avg. too close to [illegible] could [illegible] [illegible]

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

Start 10:00 - 11.35'

PLANT L-1

DATE 4/20/78

LOCATION Root

OPERATOR D.V.S

STACK NO. St-6

RUN NO. 1

SAMPLE BOX NO. RAC (Old)

METER BOX NO. RAES

AMBIENT TEMPERATURE 50-52

BAROMETRIC PRESSURE 28.94

ASSUMED MOISTURE, % 5 1/0

PROBE LENGTH, in. 60"

NOZZLE DIAMETER, in. 3/8"

STACK DIAMETER, in. 37 1/4"

PROBE HEATER SETTING 250

HEATER BOX SETTING Full

METER $\Delta H_@$ 1.8

C FACTOR 0.168

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
E-1	5	-.13	~~40~~	.35	.592	3.8	3.8	727.63	76 75	74	180	51	5.2	
2	5	"	~~40~~	.35	.592	3.8	3.8	733.	85 80	75	220	56	5.3	
3	5	"	530	.38	.616	4.0	4.0	738	92 84	76	243	58	5.8	
4	5	"	538	.39	.624	4.3	4.3	743	97 87	77	257	63	6.0	
5	5	"	538	.43	.656	4.7	4.7	748	95 88	77	245	65	6.5	
6	5	"	537	.42	.648	4.6	4.6	754	102 91	80	233	68	6.5	
7	5	"	549	.43	.671	5.0	5.0	760	104 93	82	220	69	7.0	
8	5	"	551	.53	.728	5.9	5.9	766	103 93	83	222	69	7.5	
9	5	"	551	.45	.671	4.6	4.6	772	103 93	83	233	70	6.5	
10	5	"	559	.47	.686	5.2	5.2	778	105 94	83	242	68	7.0	
11	5	"	553	.43	.671	4.6	4.6	784	105 94	83	245	67	7.0	
12	5	"	553	.40	.632	4.4	4.4	790	104 94	84	254	65	6.5	
13	5	"	553	.40	.632	4.4	4.4	796	102 93	84	257	64	6.5	
14	5	"	549	.40	.632	4.4	4.4	802	100 91	82	255	65	6.5	
15	5	"	550	.38	.616	4.0	4.0	808	100 91	82	252	64	6.0	
TOTAL 16	5.	"	546	.35	.592	3.9	3.9	813	100 91	82	248	63	6.0	
Total AVERAGE Average	160	-.13	15 381 5.49	⊠	.416	10:35 10:05 .645	143.3 4.48	818.33 180.96		2732 85.4	77.14 242	2194 68.6	200.5 6.3	

COMMENTS:

VOLUME OF LIQUID WATER COLLECTED

	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT

	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

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PARTICULATE LAB WORKSHEET

Site Desig. L1 Date April 20, 78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O rinse after filter (water sol. only)	H-20	90.5143	90.5032	.0111
	H-19	92.1254	92.0932	.0322
	____	____	____	____
H_2O rinse before filter (water sol. only)	H-18	930.667	92.9342	.1325
	____	____	____	____
Acetone rinse after filter	H-14	94.4984	94.4946	.0038
Acetone rinse before filter	H-17	93.8028	93.7106	.0922
	Filter #			
Impinger catch and H_2O rinse after filter (water insol. only)	23-.8	.07500	.07318	.00182
	30-.45	.10314	.10248	.00066
	26-.22	.09646	.09694	.00152
H_2O rinse before filter (water insol. only)	24-.8	.61700	.07264	.54436
	31-.45	.10180	.10178	.00002
	27-.22	.09718	.09718	—
Test Filter	101	1.99400	.69240	1.3016
			TOTAL MASS	2.12178

Dry Gas Meter Vol. (ft^3)

Final	816.33
Initial	637.375
Δ DgV	180.96

Imp. Water Vol. (Ml.)			
1	2	3	4
87	181	44	258
100	100	0	200
-13	81	44	58
	Total H_2O		170

IMPACTOR DATA SHEET

Site Desig. L1 Date 4/19/78

Sample Location STACK Sample No. _____

P_b 29.14 "Hg Assmd Moisture 4% Noz. Dia. 5/16"

Stk. Dia 37.25" Sample Point ____ Sample Time 90 MIN

Stat P -.13 "H_2O Pitot Tube ΔP .469 "H_2O Stk T 538 °F

ΔH Orfice 2.61 "H_2O Liquid Col. 63.9 ml Sample Vol. 74.75 scf

D_p	Net Wt. (milligm)	Percent
12.50	82.19	14.33
45.0	24.3	4.24
30.0	19.7	3.44
20.0	163.22	28.47
9.46	47.54	8.29
5.85	43.72	7.63
3.93	36.98	6.45
2.64	31.85	5.56
1.66	25.04	4.37
.77	21.03	3.67
.43	26.78	4.50
.242	52.03	9.07
Total	573.38 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L1 Date 04/19/78

Sample Location STACK Sample No. _____

P_b 29.14 "Hg Assmd Moisture 5% Noz. Dia. 1/2"

Stk. Dia 37.25" Sample Point _____ Sample Time 40 MIN

Stat P -.13 "H_2O Pitot Tube ΔP .354 "H_2O Stk T 536 °F

ΔH Orfice 9.75 "H_2O Liquid Col. 90 ml Sample Vol. 66.27 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	-	-	36.3	7.8
63	-	-	52.6	11.3
30.89	.0783	.0687	9.6	2.06
27.01	.1197	.0783	41.4	8.9
18.73	.1797	.1197	60.0	12.89
12.7	.2653	.1797	85.6	18.4
6.8	.3410	.2653	75.7	16.27
3.84	.4016	.3410	60.6	13.02
2.48	.4451	.4016	43.5	9.35
		Total	465.3 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L1 Date 04/20/78

Sample Location Boiler Outlet Sample No. _____

P_b 28.94 Assmd Moisture 5% Noz. Dia. 3/8"

Stk. Dia 36" Sample Point ____ Sample Time 120 MIN

Stat P -3.3 "H_2O Pitot Tube ΔP .295 "H_2O Stk T 565 °F

ΔH Orfice 3.37 "H_2O Liquid Col. 116 ml Sample Vol. 107.3 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
125	–	–	109.7	20.31
63	–	–	79.2	14.66
30.89	.2186	.1970	21.6	4.0
27.01	.2713	.2186	52.7	9.76
18.73	.3199	.2713	48.6	9.0
12.7	.3873	.3199	67.4	12.48
6.8	.4700	.3873	82.7	15.31
3.84	.5129	.4700	42.9	7.94
2.48	.5483	.5129	35.4	6.55
		Total	570.2 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-1
DATE APRIL 19-20, 1978
~~PROJECT NO. E.G.A.~~ _____
BOILER NO 4
DURATION OF TEST _____

FACTORS
INTEGRATOR x 900
CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART Thses. Flow		SUPER HEAT TEMP.	FEED WATER TEMP. @ ECON. IN	FEED WATER TEMP. @ ECON. OUT	FLUE GAS TEMP. ECON. OUT	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES HDR.	F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. BOT. IN	DUST COLL. BOT. OUT	DUST COLL. DIFF. IN-OUT	BOILER OUT CO_2 %	BOILER OUT O_2 %	BOILER OUT CO %	REMARKS
	APRIL 19, 1978		STACK	TRAVERSE / PARTICULATE							SIZE TESTS															
PM 12:30	-	7558	28.0	-	220	-	570	72	-	-	129	182	3.0	-	-	-	-	-	.08	0.7	2.0	93	9.0	10.4	@	FULL ASHES, MEAS FLOW PRIOR TO TEST
1:00	-	7585	28.0	-	218	-	565	72	-	-	129	182	2.6	-	-	-	-	-	.07	0.7	2.1	91	9.4	10.0	@	BOILER FULL ASHMAN
1:30	-	7631	27.0	-	217	-	550	72	-	-	129	182	2.6	-	-	-	-	-	.07	0.6	2.0	91	9.1	10.0	@	
2:00	-	7655	27.0	-	217	-	555	72	-	-	129	182	2.6	-	-	-	-	-	.07	0.7	1.9	95	8.9	10.3	@	
2:30	-	7688	27.0	-	217	-	560	72	-	-	129	182	2.6	-	-	-	-	-	.07	0.6	1.9	95	8.9	10.3	@	
3:00	-	7718	27.5	-	216	-	560	72	-	-	129	182	3.1	-	-	-	-	-	.08	0.7	2.1	92	9.0	10.1	@	
3:30	-	7747	27.5	-	216	-	555	72	-	-	129	182	2.6	-	-	-	-	-	0.07	0.7	1.8	85	9.5	9.7	@	
3:45	-	7775	27.0	-	216		550	72	-	-	129	182	2.6	-	-	-	-	-	0.07	0.7	1.9	85	9.9	9.7	@	
Av.					217			72			129	182											9.1	10.09	@	

@ NOTE: FLUE GAS TESTS AT BOILER OUTLET AND DUCT LOCATION IN STACK INDICATE THERE WAS NO AIR INFILTRATION BETWEEN THESE TWO POINTS.

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-1
DATE April 19-20, 1978
PROJECT NO. G.S.A. _____
BOILER NO. 4
DURATION OF TEST _____

FACTORS
INTEGRATOR x 400
CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART INTEG.	STEAM FLOW	SUPER HEAT TEMP.	FEED WATER TEMP. @ ECON. IN	FEED WATER TEMP. @ ECON. OUT	FLUE GAS TEMP. ECON. EXIT	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES HDR.	F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. ASH IN	DUST COLL. ASH OUT	STACK DEW. POINT & ASH	Boiler Out CO_2	Boiler Out O_2	Boiler Out CO	REMARKS
	April 20, 1978 Particulate Emission / Particulate Size Tests																									Full Ashes, Blow Down Prior To Emission Test
AM 8:30		8519	28.5	-	217	-	575	72	-	-	169	183	2.9	-	-	-	-	-	.07	1.05	2.9	83	9.9	9.6	0	Start Emission Test *
9:00	1854	8581	29.5	-	217	-	567	72	-	-	169	183	2.9	-	-	-	-	-	.08	0.8	2.1	83	9.5	9.6	0	Boiler Full Automatic
9:30	1888	8570	29.5	-	217	-	560	72	-	-	169	183	2.5	-	-	-	-	-	.07	0.6	2.2	84	9.9	9.7	0	
10:00		8663	29.0	-	217	-	562	78	-	-	169	183	2.5	-	-	-	-	-	.07	0.8	2.1	67	10.9	9.7	0	
10:30	1987	8660	29.0	-	217	-	560	79	-	-	169	183	2.9	-	-	-	-	-	.08	0.9	2.9	60	11.1	9.0	0	
11:00	1999	8697	30.8	-	217	-	560	79	-	-	169	183	2.5	-	-	-	-	-	.07	0.8	2.1	67	10.4	9.6	0	
11:35	1850	8735	29.8	-	217	-	562	79	-	-	169	183	2.3	-	-	-	-	-	.07	0.7	2.0	78	9.8	9.4	0	End Emission Test *
Coal Hopper	-108																									
Ave					217			73			169	183										72.7	10.0	9.0	0	
Total	9939																									* Coal Hopper Leveled At 9:30 And 11:35 AM

Fly Ash Removed From Collector = 29.5 Lbs.

* Note: Flue Gas Tests At Boiler Outlet And Port Location In Stack Indicate There Was No Air Infiltration Between These Two Points.

SECTION 2.0

SITE L2 DATA

	PAGE
PARTICULATE FIELD DATA SHEETS	12
PARTICULATE LAB WORKSHEET	14
IMPACTOR DATA SHEETS	15
BAHCO SIZE DATA SHEETS	17
BOILER SYSTEM TEST DATA SHEETS	19

Leak Test .003 cfm @ 15" Hg

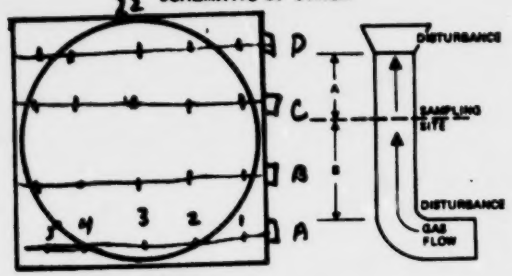
0.11" 9.90 $\frac{1}{15}$ ap

0.25" 4.06 $\frac{T}{19}$ ap

22

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



40

160 11" 9

Start 0900

PLANT	L-2	AMBIENT TEMPERATURE	83
DATE	6/8/79	BAROMETRIC PRESSURE	28.50
LOCATION	After Collector	ASSUMED MOISTURE, %	7
OPERATOR	Anderson - Davis	PROBE LENGTH, in.	36"
STACK NO.	Boiler #4	NOZZLE DIAMETER, in.	5/16"
RUN NO.	Certification	STACK DIAMETER, in.	48" x 22"
SAMPLE BOX NO.	RAC	PROBE HEATER SETTING	70%-100%
METER BOX NO.	RAC	HEATER BOX SETTING	250
METER $\Delta H_@$	1.9		
C FACTOR	0.32		
PROCESS WEIGHT RATE			

1/2

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

12

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	# 4 STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	# 3 SAMPLE BOX TEMPERATURE °F	# 2 TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
D 1	5	-0.48	325 ? *	0.21	0.458	1.2	1.2	527.435	84	84	172	62	0	
2	5	"	478	0.23	0.480	1.33	1.33	530.	86	92	208	60	0	
3	5	"	479	0.25	0.50	1.45	1.45	533.875	88	98	237	61	0	
4	5	"	482	0.24	0.510	1.50	1.50	537.250	88	96 104	251	64	0	
5	5	"	485	0.20	0.447	1.16	1.16	540.730	90	98 106	256	66	0	
Total	25	-0.48	1924		2.395	6.64		543.600		460	1124	313	0	
Avg	5	-0.48	481	0.229	0.479	1.328		16.215		92	225	63	0	
C 1	5	-0.48	380 ?	0.24	0.510	1.50	1.50	543.650	94	98 102	206	65	0	
2	5	"	477	0.23	0.480	1.33	1.33	547.09	94	100 106	226	62	0	
3	5	"	478	0.23	0.480	1.33	1.33	550.378	95	101 107	235	64	0	
4	5	"	479	0.25	0.529	1.62	1.62	553.610	96	104 113	252	66	0	
5	5	"	481	0.30	0.548	1.75	1.75	557.170	98	106 114	272	66	0.5	
								560.942						
TOTAL	50	-0.48	3845		4.941	14.17		33.507		969	2315	636	0	
AVERAGE	5	-0.48	481	0.244	0.494	1.417				97	232	64	0	

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

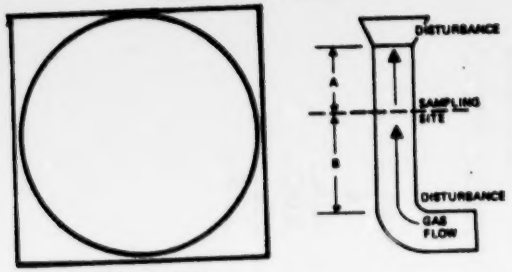
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1	Avg	14.4	4.5	0	81.1
2					
3					

COMMENTS:

* Point 1 was not used in calculating Avg. Stack Gas Temp

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT L-2
DATE 6/8/78
LOCATION After Collector
OPERATOR Anderson - Davis
STACK NO. Boiler #4
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 83
BAROMETRIC PRESSURE 28.5
ASSUMED MOISTURE, % 9
PROBE LENGTH, in. 36"
NOZZLE DIAMETER, in. 5/16
STACK DIAMETER, in. 40 x 22
PROBE HEATER SETTING 5
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.9 (1/16 = 0.33)
C FACTOR
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

Start 0900 End 1130

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
B-1	5 min	-0.48	305	0.25	0.50	1.45	1.45	560.942	98	101 104	215	68	0	
2	5	"	483	0.27	0.520	1.57	1.57	564.	98	103 108	223	63	0	
3	5	"	484	0.23	0.48	1.33	1.33	567.347	100	105 110	221	62	0	
4	5	"	483	0.27	0.520	1.57	1.57	571.175	100	106 112	211	63	.5	
5	5	"	486	0.31	0.557	1.80	1.80	574.	101	109 115	211	61	1.0	
Total	25		1936		2576			578.585						
Avg	5	-0.48	484	0.265	0.515									
A 1	5	-0.48	315	0.18	0.424	1.05	1.05	578.585	100	102 104	200	66	0	
2	5	"	477	0.26	0.510	1.50	1.50	581.596	100	105 110	200	65	.5	
3	5	"	490	0.27	0.520	1.57	1.57	585.110	100	107 114	193	61	.5	
4	5	"	483	0.28		1.62	1.62	588.711	100	108 116	196	61	1.0	
5	5	"	487	0.29	0.539	1.70	1.70	592.330	102	109 116	196	62	1.0	
								596.040						
TOTAL	100		7708		11.038	29.33				2023	4381	1264	5	
AVERAGE	5	-0.48	482	0.252	0.50R	1.466		68.605		101	219	63	0.25	

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	179	12	4		216
INITIAL	100	100	0		200
LIQUID COLLECTED	79	21	4		16
TOTAL VOLUME COLLECTED					120

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

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PARTICULATE LAB WORKSHEET

Site Desig. L-2 Date June, 7/78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O rinse after filter (water sol. only)	I-5	91.4640	91.4558	.0082
	I-10	94.6125	94.6005	.0120
	------	------	------	------
H_2O rinse before filter (water sol. only)	I-11	95.5035	95.4802	.0233
	I-6	94.2884	94.2652	.0232
Acetone rinse after filter	I-12	91.0665	91.0634	.0031
Acetone rinse before filter	I-7	91.4663	91.4396	.0267
	Filter #			
Impinger catch and H_2O rinse after filter (water insol. only)	44-.8	.08795	.08410	.00385
	48-.45	.09345	.09217	.00128
	41-.22	.08918	.08707	.00211
H_2O rinse before filter (water insol. only)	43-.8	.23613	.08346	.15267
	49-.45	.09495	.09295	.00200
	40-.22	.04830	.08627	.00203
Test Filter	102	.89665	.65090	.24575
			TOTAL MASS	1.13832

Dry Gas Meter Vol. (ft^3)

Final 596.040
Initial 527.435
Δ DgV 68.605

Imp. Water Vol. (Ml.)

1	2	3	4
179	121	4	216
100	100	0	200
79	21	4	16
	Total H_2O		120

IMPACTOR DATA SHEET

Date Jun 7,78

Site Desig. L2

Sample Location Before Collector Sample No. _____

P_b 28.5 "Hg Assmd Moisture 7% Noz. Dia. 1/2"

Stk. Dia 100-18" Sample Point _____ Sample Time 40 MIN

Stat P -.2 "H_2O Pitot Tube ΔP .05 "H_2O Stk T 500 °F

ΔH Orfice 2. "H_2O Liquid Col. 43.66 ml Sample Vol. 26.68 scf

D_p	Net Wt. (milligm)	Percent
125	137.57	31.19
45	61.95	14.05
30	56.93	12.91
20	73.16	16.59
10	17.95	4.07
6.41	16.26	3.69
4.32	13.20	2.99
2.91	5.73	1.30
1.83	6.06	1.37
.87	13.90	3.15
.49	12.01	2.72
.288	26.36	5.98
Total	441.08 Milligrms	

IMPACTOR DATA SHEET

Site Desig. L-2 Date Jun 7, 78

Sample Location After Collector Sample No. _____

P_b 28.64 Assmd Moisture 7% Noz. Dia. 1/4"

Stk. Dia 40"-22" Sample Point _____ Sample Time 105 M;N

Stat P -.48 "H_2O Pitot Tube ΔP .28 "H_2O Stk T 490 °F

ΔH Orfice .98 "H_2O Liquid Col. 68 ml Sample Vol. 44.51 scf

D_p	Net Wt. (milligm)	Percent
125	188.33	28.09
45	95.79	14.29
30	88.84	13.25
20	109.62	16.35
10.	25.14	3.75
8.14	25.67	3.83
5.49	21.62	3.22
3.72	18.92	2.82
2.36	16.07	2.40
1.14	13.88	2.07
.67	18.33	2.73
.42	48.35	7.21
Total	670.56 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L2 Date 7 Jun 78

Sample Location Before Collector Sample No. _____

P_b 28.5 "Hg Assmd Moisture 7% Noz. Dia. 1/2

Stk. Dia 100"-18" Sample Point _____ Sample Time 51

Stat P -.2 "H_2O Pitot Tube ΔP .05 "H_2O Stk T 500°F

ΔH Orfice 2.0 "H_2O Liquid Col. 56.34ml Sample Vol. 34.8 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	—	—	66.7	17.73
63.0	.0390	.0352	49.5	13.16
30.89	.1304	.0390	91.4	24.30
27.01	.1669	.1304	36.5	9.7
18.73	.1940	.1669	27.1	7.21
12.7	.2326	.1940	38.6	10.26
6.8	.2644	.2326	31.8	8.46
3.84	.2829	.2644	18.5	4.92
2.48	.2989	.2829	16.0	4.25
		Total	376.1 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L 2 Date 7 Jun 78

Sample Location After Collector Sample No. _____

P_b 28.61 Assmd Moisture 7.0 Noz. Dia. 3/8

Stk. Dia 40.22 Sample Point _____ Sample Time 100 MIN

Stat P .45 "H_2O Pitot Tube ΔP .258 "H_2O Stk T 486 °F

ΔH Orfice 3.62 "H_2O Liquid Col. 153 ml Sample Vol. 93.66 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	—	—	176.8	15.41
63	.3062	.2845	313.5	27.32
30.89	.3454	.3062	39.2	3.42
27.01	.4449	.3454	99.5	8.67
18.73	.5652	.4449	120.3	10.48
12.7	.6941	.5652	128.9	11.23
6.8	.8373	.6941	143.2	12.48
3.84	.9075	.8373	70.2	6.12
2.48	.9633	.9075	55.8	4.86
		Total	1147.4 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-2
DATE JUNE 7-8, 1978
PROJECT NO. G.S.A. _____
BOILER NO. #
DURATION OF TEST _____

FACTORS
INTEGRATOR x 4.50
CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART Sq. Flow Intgr.	SUPER HEAT TEMP. Air flow	FEED WATER TEMP. @ ECON. IN	FEED WATER TEMP. @ ECON. OUT	FLUE GAS TEMP. Econ. Out	COND. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES HPR.	F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	BOILER BAR. Out	FURN.	DUST COLL. DIFF. in	DUST COLL. OUT	STACK DE N. R.	CO_2 At Outlet	O_2 At Outlet	CO	REMARKS
	JUNE 7, 1978		STACK TRAVERSE /		PARTICULATE				SIZE		TEST														
AM 9:00	–	23.0	72117	12.0	230	7th/8th	505	73	–	126	–	193	2.0	0.45	1.3	0.20	0	0.20	0.07	5.3	5.6	–	12.0	–	–	9:10 FUEL AERAL, BOOM TRUCK
	–	23.0	72126	12.0	230	–	515	75	–	125	–	193	2.6	0.80	1.7	0.30	0.10	0.30	0.05	5.6	5.8	2	19.0	–	–	9:20 BOILER CONTROLS ON
10:00	–	23.0	72126	12.0	230	–	515	75	–	125	–	193	2.6	0.80	1.7	0.30	0.10	0.30	0.05	5.6	5.8	2	19.0	–	–	FUEL AUTOMATIC.
10:30	–	23.0	72126	12.0	230	–	515	75	–	125	–	193	2.6	0.80	1.7	0.30	0.10	0.30	0.05	5.6	5.8	2	19.0	–	–	"
11:00	–	23.0	72126	12.0	230	–	515	75	–	125	–	193	2.6	0.80	1.7	0.30	0.10	0.30	0.05	5.6	5.8	2	19.0	–	–	"
11:30	–	25.0	72173	12.5	230	–	520	78	–	126	–	193	1.9	0.60	1.2	0.20	0	0.30	0.08	5.1	5.9	–	13.5	–	–	"
12:00	–	25.0	72173	12.5	230	–	520	78	–	126	–	193	1.9	0.60	1.2	0.20	0	0.30	0.08	5.1	5.9	–	13.5	–	–	"
	–	25.0	72196	13.0	230	9th/10th	535	78	–	126	–	193	2.1	0.85	1.2	0.30	0	0.30	0.08	5.9	5.6	–	13.0	–	–	"
12:30	–	25.0	72196	13.0	230	9th/10th	535	78	–	126	–	193	2.1	0.85	1.2	0.30	0	0.30	0.08	5.9	5.6	–	13.0	–	–	"
	–	25.0	72196	13.0	230	9th/10th	535	78	–	126	–	193	2.2	0.90	1.9	0.40	0	0.30	0.02	5.6	5.9	–	14.5	–	–	VALVING TO ATMOSPHERE
PM 12:30	–	29.5	72318	13.0	230	9th/10th	535	77	–	126	–	193	2.2	0.90	1.9	0.40	0	0.30	0.02	5.6	5.9	–	14.5	–	–	"
	–	29.5	72318	13.0	230	9th/10th	535	77	–	126	–	193	2.1	0.80	1.3	0.20	0	0.30	0.06	5.5	5.9	–	19.0	5.1	0	10:30 TUCKLAN STARTED.
1:00	–	25.5	72398	19.0	230	7th/8th	540	77	–	126	–	188	2.1	0.80	1.3	0.20	0	0.30	0.06	5.5	5.9	–	19.0	5.1	0	GAS FROM 6" TO 6½".
1:30	–	29.0	72375	13.5	230	9th/10th	535	76	–	126	–	193	2.9	0.70	1.5	0.30	0.10	0.30	0.07	5.6	5.9	–	12.0	6.0	0	"
2:00	–	29.0	72375	13.5	230	9th/10th	535	76	–	126	–	193	2.9	0.70	1.5	0.30	0	0.30	0.06	5.6	5.9	–	12.6	5.4	0	HEAVY SMOKE BILLOWING OUT
2:00	–	29.5	72402	19.0	230	9th/10th	535	76	–	126	–	188	2.2	0.80	1.3	0.20	0	0.30	0.06	5.6	5.9	–	12.6	5.4	0	WHEN STOKER VIBRATES.
2:30	–	29.0	72427	13.0	230	9th/10th	530	76	–	126	–	188	2.2	0.80	1.3	0.20	0	0.30	0.03	5.7	5.9	–	13.8	5.2	0	11:15 CLOSED VENT TO
																										REDUCE LOAD.
APPL.	–	25369	–	–	230	–	–	–	–	126	–	191	–	–	–	–	–	–	–	–	–	–	13.3	5.9	0	1:00 PM: RECHARGE GATE
																										HEIGHT TO 6½".

NOTE: FLUE GAS TESTS AT BOILER OUTLET AND PORT LOCATION IN BREECHING INDICATED THAT NO AIR INFILTRATION BETWEEN THESE TWO POINTS.

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-2
DATE June 7-8, 1978
PROJECT NO. G.S.A. —
BOILER NO. #
DURATION OF TEST —

FACTORS
INTEGRATOR x 9.50
CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART St.Flow Integ.	Air Flow	SUPER HEAT TEMP.	FEED WATER TEMP. ECON IN	ECON OUT	FLUE GAS TEMP. ECON OUT	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	HPR.	F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE Diff. Air → Gas	FURN.	DUST COLL. Diff. -in	DUST COLL. OUT	STACK DE N. R.	CO_2	O_2	CO	REMARKS
	June 8, 1978		Particulate Emission / Particulate Size Tests																							
AM 9:00	—	25.0	73230	11.0	229	90/65	520	75	—	126	—	198	1.9	0.35	1.6	0.20	0	0.20	0.09	5.0	5.6	—	19.7	3.6	0	7:35 Pole Asmi, Blow Tubes
9:30	1680	25.0	73295	12.0	229	90/65	520	75	—	126	—	190	2.4	0.45	1.9	0.20	0	0.20	0.05	5.6	5.8	—	19.5	4.5	0	9:30 Level Coal Hopper,
10:00	—	24.5	73283	11.0	229	80/65	518	75	—	125	—	194	1.75	0.35	1.1	0.20	0	0.20	0.08	5.0	5.3	—	19.6	4.9	0	Start Test. Blowing
10:30	2300	25.0	73316	12.0	229	90/65	519	76	—	126	—	197	1.70	0.30	1.1	0.25	0	0.20	0.10	5.4	5.4	—	19.3	4.7	0	Steam to maintain load.
11:00	—	24.5	73391	11.0	230	90/65	520	75	—	126	—	193	1.65	0.45	1.0	0.20	0	0.20	0.10	5.6	5.9	—	19.3	4.5	0	Control full Automatic.
11:25	2340	26.0	73365	12.0	230	90/65	523	76	—	126	—	195	1.9	0.30	1.15	0.25	0	0.20	0.07	5.6	5.8	—	19.1	4.7	0	Steam Gate 2½"
	6340																									11:25 Level Coal Hopper.
Coal Sample	- 20		For Ash Removed from Collector + 6 Lbs																							End Emission Test
Total	6320	49003	—	—	—	—	—	—																		
Ave	—	25,007	—	—	229	—	—	75	—	126	—	193	—	—	—	—	—	—	—	—	—	—	19.9	4.5	0	12:40 Pole Ashm
																										1:50 Popped Safety
PM 1:50	—	24.0	73289	12.5	230	90/65	525	79	—	126	—	190	6.2	0.90	1.2	0.20	0	0.20	0.09	5.8	5.9	—	19.3	4.5	0	2:25 Steam Gate
2:10	—	23.5	73511	12.0	230	90/65	520	79	—	126	—	193	1.9	0.25	1.0	0.15	0	0.20	0.09	5.8	5.9	—	19.1	4.6	0	Recirculate To 6 2"
2:30	—	24.0	73528	12.5	230	90/65	516	79	—	126	—	195	1.5	0.25	0.95	0.15	0	0.20	0.09	4.6	4.8	—	19.9	3.6	0	3:25 Saving Ramp Hour,
3:10	—	22.5	73563	12.5	230	90/65	520	78	—	126	—	193	1.7	0.30	1.0	0.60	0	0.20	0.07	5.6	5.8	—	19.0	4.8	0	Load Temper 8,000 Lb/Hr
3:50	—	23.0	73589	12.5	230	90/65	530	77	—	126	—	195	2.3	0.40	1.5	0.30	0	0.20	0.08	5.7	6.0	—	19.3	5.0	0	Switching 12,000 Lb/Hr
4:35	—	23.0	73699	13.0	230	80/65	525	79	—	129	—	190	1.2	0.40	0.70	0.30	0	0.20	0.07	4.8	5.0	—	—	—	—	Stack Reduce No 2 As Above.
Ave.	—	—	—	—	230	—	—	78	—	126	—	193	—	—	—	—	—	—	—	—	—	—	19.1	4.7	0	4:40 Coal Returned To
	Note:	Flue Gas Tests at Boiler Outlet																								Normal - Stack Clear.
		And Port Location in Breeching																								
		Indicates There Was No Air Infiltration																								
		Between This and Point																								

SECTION 3.0

SITE L3 DATA

	PAGE
PARTICULATE FIELD DATA SHEETS	22
PARTICULATE LAB WORKSHEET	25
IMPACTOR DATA SHEETS	26
BAHCO SIZE DATA SHEETS	28
BOILER SYSTEM TEST DATA SHEETS	30

6209 $\frac{1}{6}$ ΔP

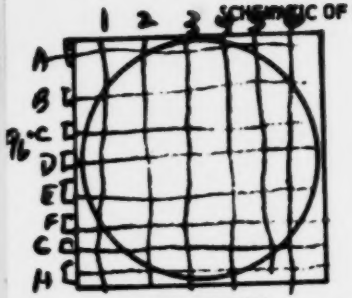
48"

Start Leak Test @ 15" Hg 0.002

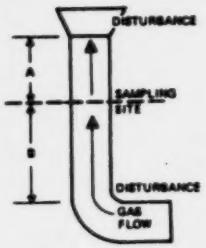
V 3

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



Start 0810

PLANT L-3

DATE 6/15/78

LOCATION Roof in Breaching

OPERATOR Anderson-Davis

STACK NO. Boiler # 1

RUN NO. Certification

SAMPLE BOX NO. RAC

METER BOX NO. RAC

AMBIENT TEMPERATURE 55°

BAROMETRIC PRESSURE 28.96

ASSUMED MOISTURE, % 5

PROBE LENGTH, in. 60"

NOZZLE DIAMETER, in. 1/2"

STACK DIAMETER, in. 96" x 48"

PROBE HEATER SETTING Full

HEATER BOX SETTING 250

METER ΔH@ 1.9

C FACTOR .042

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	#2 STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	#3 SAMPLE BOX TEMPERATURE °F	#4 TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
A 1	5 min.	-.64	390	.035 .1871	1.55	1.55	640.54	60 64	64	211	51	0	
2	"	"	425	.042 .2049	1.85	1.85	643.8	80 73	66	233	49	0	
3	"	"	425	.037 .19235	1.60	1.60	647.8	85 79	70	251	52	0	
4	"	"	429	.030 .1732	1.31	1.31	651.3	92 83	74	246	56	0	
5	"	"	416	.028 .1673	1.25	1.25	654.5	96 86	76	244	59	0	
6	"	"	410	.023 .1493	0.98	0.98	657.	100 90	80	244	60	0	
B 1	"	"	391	.037 .1923	1.65	1.65	660.55	94 88	82	234	59	0	
2	"	"	418	.040 .2000	1.75	1.75	664.3	100 92	84	236	55	0	
3	"	"	416	.030 .1732	1.31	1.31	667.7	104 95	86	239	53	0	
4	"	"	408	.025 .1581	1.10	1.10	670.3	104 97	86	238	54	0	
5	"	"	402	.022 .1483	.98	.98	674.1	105 96	87	243	51	0	
6	"	"	387	.020 .1414	.85	.85	676.9	106 97	88	242	57	0	
C 1	"	"	390	.030 .1732	1.30	1.30	679.65	95 91	87	227	60	0	
2	"	"	396	.030 .1732	1.3	1.30	682.9	99 93	87	236	53	0	
3	"	"	380	.025 .1581	1.10	1.10	686.2	102 95	88	232	55	0	
TOTAL N	"	"	375	.028 .1449	0.86	0.86	689.2	102 98	89	236	57	0	
AVERAGE	80		6452		2.7381	20.94	51.41		1412	3798	884	0	

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

- 0.64

403

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:

Used 0.25" H_2O Magnehelic to measure ΔP_s

22

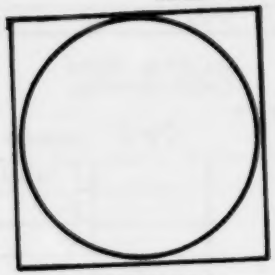
0850

0930

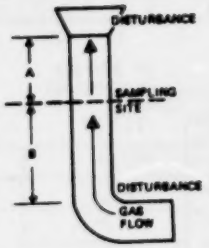
0950

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT L-3

DATE 6 May 78

LOCATION Roof on Breading

OPERATOR Anderson - Davis

STACK NO. Boiler #1

RUN NO. Certification

SAMPLE BOX NO. RAC

METER BOX NO. RAC

AMBIENT TEMPERATURE 70

BAROMETRIC PRESSURE 28.93

ASSUMED MOISTURE, % 5

PROBE LENGTH, in. 60"

NOZZLE DIAMETER, in. ½"

STACK DIAMETER, in. 96 x 48

PROBE HEATER SETTING Full

HEATER BOX SETTING 250

METER $\Delta H_@$ 1.9

C FACTOR .642

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (Tm_{IN}), °F		OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
C 5	5 min	-.64	370	.018	.1342	0.80	0.80	691.95	102	96	89	235	57	8	
6	"	"	350	.015		0.68	0.68	694.6	102	95	88	232	69	8	
D 1	"	"	390	.030		1.3	1.3	696.94	95	92	89	228	55	0	
2	"	"	382	.033		1.55	1.55	700.1	100	94	88	236	53	.5	
3	"	"	372	.028		1.25	1.25	703.7	103	96	89	238	56	.5	
4	"	"	360	.020		.84	.84	707.0	103	96	89	237	58	0	
5	"	"	348	.013		.57	.57	709.7	102	96	90	234	60	0	
6	"	"	352	.010		.44	.44	712.0	102	96	90	236	62	0	
E 1	"	"	383	.019		0.80	0.80	713.94	95	92	89	232	67	0	
2	"	"	389	.020		.84	.84	716.5	100	95	90	247	59	0	
3	"	"	338	.015		.66	.66	719.2	100	95	90	248	58	0	
4	"	"	328	.013		.66	.66	721.7	100	95	90	252	59	0	
5	"	"	318	.010		.44	.44	724.0	100	96	92	247	59	0	
6	"	"	320	.008		.36	.36	726.0	100	96	92	249	60	0	
F 1	"	"	360	.028		1.25	1.25	727.83	99	95	91	248	58	.5	
TOTAL 2	"	"	372	.028		1.25	1.25	731.0	103	97	91	251	56	.5	
AVERAGE	80	-.64	5722		2.1943	13.67	.855	734.3		1522		3850	936	2.0	

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

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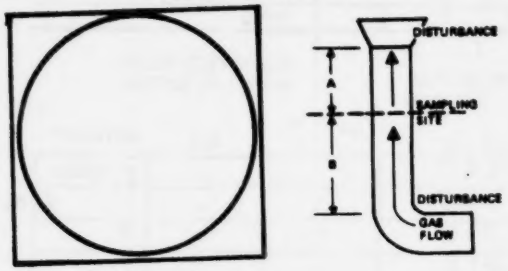
(312) 766-7013

End Leak Test @ 15" Hg .004 ✓3

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT L-3
DATE 11/6/H5-178
LOCATION Roof in Breaching
OPERATOR Anderson-Davis
STACK NO. Boiler # 1
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 70
BAROMETRIC PRESSURE 28.96
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 1/2"
STACK DIAMETER, in. 96 x 48
PROBE HEATER SETTING Full
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.9
C FACTOR .042
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

END = 1310

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
F 3	5 min	-.64	370	.025	1.1	1.1	734.3	106 99	92	253	57	0.5	
4	"	"	356	.020	.84	.84	737.4	106 99	92	250	58	0	
5	"	"	341	.025	1.1	1.1	740.1	110 102	94	253	59	0.5	
6	"	"	330	.010	.44	.44	743.3	107 100	93	255	63	0	
G 1	"	"	394	.03	1.31	1.31	745.47	98 95	92	232	63	1.5	
2	"	"	398	.035	1.55	1.65	749.7	104 98	92	246	65	0.5	
3	"	"	399	.038	1.67	1.67	752.2	110 102	94	247	56	0.0	
4	"	"	400	.039	1.68	1.68	755.9	114 105	96	254	59	1.0	
5	"	"	383	.040	1.75	1.75	759.8	116 106	96	254	61	1.0	
6	"	"	362	.03	1.3	1.3	763.3	115 106	97	253	62	0.5	
H 1	"	"	360	.03	1.3	1.3	766.73	104 99	94	235	63	0.5	
2	"	"	419	.035	1.55	1.55	770.0	106 101	96	256	60	0.5	
3	"	"	430	.035	1.55	1.55	773.5	110 103	96	259	60	0.5	
4	"	"	420	.035	1.55	1.55	777.2	114 105	96	266	63	0.5	
5	"	"	390	.03	.84	.84	781.	114 105	96	270	65	0	
TOTAL 6	"	"	400	.03	1.31	1.31	783.	114 105	96	272	70	1.5	
AVERAGE	240	-.64	18331	☒	2.7301	20.95	786.69	1630		11055	977	60	
					.15938	5536	146.15	95		244	58	.20	
						1.15				COMMENTS:			

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	135	118	3		230.43
INITIAL	100	100	0		200.00
LIQUID COLLECTED	35	18	3		30.43

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

PARTICULATE LAB WORKSHEET

Site Desig. L 3 Date June 15, 78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O	S-8	102.5675	102.5558	.0117
rinse after filter	S-9	89.4373	89.4266	.0107
(water sol. only)	------	------	------	------
H_2O rinse before filter	S-22	102.8007	102.7486	.0521
(water sol. only)	------	------	------	------
Acetone rinse after filter	S-21	101.7536	101.7536	0
Acetone rinse before filter	S-4	92.0276	91.9756	.0520
	Filter #			
Impinger catch and H_2O	41-.8	.09153	.08465	.00688
rinse after filter	50-.45	.09459	.09300	.00159
(water insol. only)	43-.22	.08835	.08713	.00122
H_2O rinse before filter	40-.8	.13380	.08481	.04899
	46-.45	.09496	.09283	.00213
(water insol. only)	44-.22	.08887	.08753	.00134
Test Filter	107	1.53970	.68359	.85611
			TOTAL MASS	1.03786

Dry Gas Meter Vol. (ft^3)

Final	786.69
Initial	640.54
Δ DgV	146.15

Imp. Water Vol. (Ml.)

1	2	3	4
135	118	3	230.4
100	100	0	200
35	18	3	30.4
	Total H_2O		86

IMPACTOR DATA SHEET

Site Desig. C3 Date June 14,78

Sample Location IN Breaching Sample No. _____

P_b 28.94 Assmd Moisture 3 % Noz. Dia. 1/2"

Stk. Dia 96°-48° Sample Point _____ Sample Time 80 MIN

Stat P -.64 "H_2O Pitot Tube ΔP .039 "H_2O Stk T 400 °F

ΔH Orfice 1.71 "H_2O Liquid Col. 37.05 ml Sample Vol. 53.37 scf

D_p	Net Wt. (milligm)	Percent
125	200.28	30.22
45	111.18	16.77
30	104.41	15.75
20	133.76	20.18
10	23.55	3.55
6.76	16.88	2.55
4.56	12.1	1.83
3.08	7.6	1.45
1.95	7.97	1.20
.94	9.18	1.39
.54	11.02	1.66
.33	24.89	3.76
Total	662.82 Milligrms	

IMPACTOR DATA SHEET

Site Desig. L3 Date June 15, 78

Sample Location Boiler Outlet Sample No. _____

P_b 28.96 Assmd Moisture 5% Noz. Dia. 1/2"

Stk. Dia 96"-24" Sample Point _____ Sample Time 24 MIN

Stat P -.59 "H_2O Pitot Tube ΔP .038 "H_2O Stk T 489 °F

ΔH Orfice 1.65 "H_2O Liquid Col. 11.[illegible] ml Sample Vol. 15.19 scf

D_p	Net Wt. (milligm)	Percent
125	78.21	29.78
45	42.78	16.29
30	41.26	15.71
20	56.09	21.36
9.6	9.51	3.62
5.94	8.22	3.13
4.0	6.18	2.35
2.69	3.57	1.36
1.69	2.82	1.07
.79	3.05	1.16
.44	2.97	1.13
.25	7.99	3.04
Total	262.65 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L 3 Date June 14, 78

Sample Location IN Breaching Sample No. _____

P_b 28.93 Assmd Moisture 3 % Noz. Dia. 3/4

Stk. Dia 96"-48" Sample Point _____ Sample Time 120

Stat P -.64 "H_2O Pitot Tube ΔP .026 "H_2O Stk T 400 °F

ΔH Orfice 5.64 "H_2O Liquid Col. 89 ml Sample Vol. 133.71 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	-	-	88	15.61
63	.1852	.1615	134.2	23.81
30.89	.2139	.1852	28.7	5.09
27.01	.2776	.2139	63.7	11.3
18.73	.3478	.2776	70.2	12.46
12.7	.4060	.3478	58.2	10.33
6.8	.4672	.4060	61.2	10.86
3.84	.4997	.4672	32.5	5.77
2.48	.5266	.4997	26.9	4.77
		Total	563.6 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L3 Date June 15, 78

Sample Location Boiler Outlet Sample No. _____

P_b 28.96 Assmd Moisture 4% Noz. Dia. 3/4"

Stk. Dia 96"-24" Sample Point _____ Sample Time 60 MIN

Stat P -.59 "H_2O Pitot Tube ΔP .02 "H_2O Stk T 486 °F

ΔH Orfice 4.4 "H_2O Liquid Col. 49 ml Sample Vol. 63.81 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	—	—	162.3	38.05
63	.2022	.1970	83.3	19.53
30.89	.2143	.2022	12.1	2.84
27.01	.2524	.2143	38.1	8.93
18.73	.2841	.2524	32.7	7.67
12.7	.3174	.2841	33.3	7.81
6.8	.3441	.3174	26.7	6.26
3.84	.3592	.3441	15.1	3.54
2.48	.3814	.3592	22.9	5.37
		Total	426.5 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____

LOCATION Site L-3

DATE June 15, 1938

PROJECT NO. C.S.A. _____

BOILER NO. 1

DURATION OF TEST _____

FACTORS

INTEGRATOR x 100

CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART		SUPER HEAT TEMP.	FEED WATER TEMP. @ ECON.		FLUE GAS TEMP. ECON. OUT	COMB. AIR TEMP.	SAT. STM. COND.	PRESSURES		F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. Δ P	DUST COLL. CO_2	STACK DAMP. O_2	CO_2	O_2	CO	REMARKS
		Indiv.	Chart	Air Flow x 1000	In	Out			M M	Drum	H.P.R.															
	Arrowhead		Traverse	/ Precipitate			Site	Temp															Boiler Room			
7:00	-	67250.0	18.0	17.5	230	-	500	78	-	118	-	225	1.6	0.01	-	-	-	-	0.19	0.55	9.8	16.8	9.0	0	0	11:00 Pulv. Added
7:30	-	67274.5	16.5	16.5	220	-	495	77	-	115	-	230	1.7	0.01	-	-	-	-	0.17	0.55	6.0	-	9.0	-	-	
8:00	-	67298.0	18.2	18.0	230	-	495	79	-	110	-	200	1.3	0.02	-	-	-	-	0.06	0.56	-	-	5.6	18.3	0	
8:30	-	67319.0	18.0	18.0	230	-	495	80	-	110	-	222	1.8	0.09	-	-	-	-	0.08	0.59	-	-	9.0	-	-	1:05 Pulv. Added
9:00	-	67336.5	17.0	18.2	230	-	495	81	-	109	-	225	1.7	0.04	-	-	-	-	0.02	0.50	-	-	9.5	15.9	0	
9:30	-	67350.0	16.5	16.8	230	-	485	81	-	112	-	225	1.6	0.05	-	-	-	-	0.07	0.59	5.0	-	5.0	15.6	0	
10:00	-	67360.5	16.0	17.2	230	-	495	81	-	108	-	228	1.9	0.03	-	-	-	-	0.07	0.55	-	-	9.0	-	-	9:55 Pulv. Added
10:30	-	67369.0	18.5	18.3	230	-	495	81	-	106	-	260	1.6	0.01	-	-	-	-	0.10	0.55	6.0	-	9.5	-	-	
11:00	-	67378.5	16.1	18.2	228	-	500	82	-	119	-	293	1.7	0.06	-	-	-	-	0.10	0.53	-	-	9.0	-	-	
11:30	-	67387.0	16.1	18.0	230	-	498	82	-	120	-	225	1.5	0.01	-	-	-	-	0.05	0.52	7.0	12.3	9.5	16.8	0	
12:00	-	67393.5	16.8	18.1	230	-	500	82	-	123	-	228	1.6	0.01	-	-	-	-	0.08	0.53	6.5	-	9.5	16.9	0	
12:30	-	67400.5	15.3	18.0	230	-	497	83	-	113		230	1.7	0.09	-	-	-	-	0.06	0.50	-	-	9.3	16.0	0	
13:00	-	67408.5	17.8	17.8	230	-	495	84	-	104		211	2.0	0.09	-	-	-	-	0.05	0.59	7.0	14.1	5.4	-	0	
Ave.					230			81		114		235									6.5		9.3			Controls Automatic

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____

LOCATION Site L-3

DATE June 15, 1978

PROJECT NO. C.S.A. _____

BOILER NO. 1

DURATION OF TEST _____

FACTORS

INTEGRATOR x 200

CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART Integr. Chart	SUPER HEAT TEMP. Ave from 4 hrs	FEED WATER TEMP. @ ECON. IN	FEED WATER TEMP. @ ECON. OUT	FLUE GAS TEMP. Econ Out	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES HPR.	F. W. PRESS.	WIND BOX	ASH ZONE P/T	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN. —	DUST COLL. Air In	DUST COLL. Gas Out	STACK DE H. Gas	CO_2	O_2	CO	REMARKS
																				Air Leak	Flue Gas			
	Particulate Emission / Particulate Size Test																								7:15 AM Cleaned Fire
AM 7:30		68485	12.3	19.0	442	-	990	69	-	112	-	428	1.6	0.01					0.10	0.52	6.0	-	9.9	-	-	Pulse Alert
8:00	2018	68600.5	16.0	18.2	429	-	995	66	-	113	-	209	1.9	0.01					0.10	0.55	5.8	19.1	9.3	15.7	0	7:55 Coal Hopper Level
8:30		68686.5	15.0	17.8	429	-	990	67	-	119	-	455	1.5	0.01					0.10	0.55	5.0	-	5.8	19.9	0	Six Tube Cleaned
9:00	2060	68734.0	16.0	17.6	425	-	985	68	-	120	-	440	1.6	0.01					0.10	0.55	6.3	13.5	9.4	15.8	0	
9:30		68835.0	14.9	17.8	428	-	985	70	-	121	-	435	1.5	0.05					0.12	0.55	6.5	13.3	-	-	-	
10:00	2060	68959.5	15.8	16.5	430	-	980	72	-	118	-	408	1.8	0.01					0.10	0.53	6.0	-	-	-	-	10:05 Bump Out Side
10:30		69089.5	12.5	18.9	430	-	985	74	-	113	-	470	0.9	0.00					0.07	0.55	5.8	19.0	9.6	13.2	0	10:35 Bump Other Side
11:00		69219.0	15.8	16.2	430	-	975	73	-	119	-	478	1.9	0.00					0.11	0.50	5.9	19.9	-	-	-	
11:30		69338.5	13.5	16.0	430	-	980	70	-	120	-	490	1.5	0.01					0.10	0.50	5.4	19.7	-	-	-	
12:00	2000	69459.0	13.1	17.0	430	-	980	73	-	117	-	450	1.8	0.03					0.10	0.55	5.6	19.3	9.2	15.6	0	
PM 12:30		69576.0	15.0	17.3	430	-	980	79	-	119	-	445	1.6	0.01					0.07	0.53	6.0	-	6.0	13.8	0	
1:00	2050	69700.0	19.2	17.3	430	-	980	78	-	119	-	490	1.8	0.03					0.08	0.52	6.3	13.4	-	-	-	
1:18	= 1750	69812.6	-	-	-	-	-	-	-	-	-	-	-	-					-	-	-	-	-	-	-	1:17 End Test Run
1:30	Sample = 185	69844.6	13.9	17.5	430	-	970	80	-	108	-	490	1.7	0.05					0.03	0.53	6.4	13.9	-	-	-	1:28 Bump Ashes
2:00		69898.6	14.4	17.9	430	-	980	82	-	113	-	222	1.9	0.00					0.06	0.54	6.9	13.9	-	-	-	Pull Ashes
2:30	Total Coal Burned = 8250	69978.5	12.8	15.5	430	-	990	84	-	114	-	227	0.9	0.00					0.24	0.54	6.2	13.6	5.9	14.5	0	
3:00		70058.5	11.5	16.8	430	-	960	84	-	113	-	250	1.5	0.05					0.09	0.50	6.9	14.9	5.8	19.0	0	
3:30		70143.5	13.5	17.3	430	-	960	83	-	107	-	250	1.7	0.03					0.05	0.50	6.5	13.3	5.9	19.9	0	3:35 Bumped One Side
4:00		70230.0	16.5	19.2	430	-	970	83	-	111	-	247	1.8	0.01					0.05	0.55	6.8	13.0	-	-	-	
4:24		70270	11.9	17.8	430		970	83	-	111	-	249	1.6	0.01					0.01	0.50	6.9	14.9	-	-	-	Finish Testing
Ave.					428			75		116		436								6.1					Control Automatic

SECTION 4.0

SITE L4 DATA

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PARTICULATE LAB WORKSHEET	36
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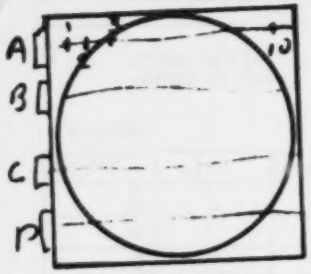
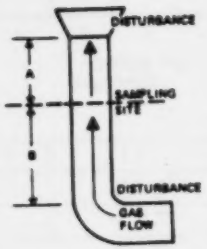
BAHCO SIZE DATA SHEETS	39
BOILER SYSTEM TEST DATA SHEETS	41

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



Start 0810

PLANT L-4
DATE 7/12/78
LOCATION After Collector
OPERATOR Anderson-Davis
STACK NO. Boiler #4
RUN NO. Certification Test
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 78
BAROMETRIC PRESSURE 29.36
ASSUMED MOISTURE, % 6
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/8
STACK DIAMETER, in. 34"x48"
PROBE HEATER SETTING Full
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.90
C FACTOR .146
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	#2 GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	AVG OUTLET ($T_{m_{OUT}}$), °F	#3 SAMPLE BOX TEMPERATURE °F	#4 TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
A 1	5 min	-.55	471	.12	1.5	1.5	953.18	83		197	57	0.5	
2	5	"	492	.15	2.0	2.0	956.77	85		230	49	0.5	
3	5	"	506	.15	2.0	2.0	960.7	91		243	50	0.5	
4	5	"	513	.15	2.0	2.0	964.63	96		255	58	1.0	
5	5	"	517	.14	1.8	1.8	968.74	98		258	61	1.0	
6	5	"	521	.16	2.1	2.1	972.59	101		258	62	2.0	
7	5 min	"	517	.15	2.0	2.0	976.66	103		251	64	1.5	
8	5	"	519	.20	2.6	2.6	980.63	102		258	63	2.5	
9	5	"	527	.23	2.8	3.0	985.?	08		261	64	3.0	
10	5	"	510	.15	2.0	2.0	990.21	104		264	57	2.0	
	50	-.55	5093	3.9801	21			979		2475	585	14.5	
1	5	-.55	490	.12	1.5	1.5	994.-	103		223	59	2.0	
2	5	"	494	.14	1.9	1.9	998.-	108		249	52	2.5	
3	5	"	510	.14	1.9	1.9	1001.83	109		249	54	2.5	
4	5	"	505	.10	1.3	1.3	1005.8	110		249	53	1.5	
TOTAL	70	-	7092	5.3805	27.6		1009.12	1411		3445	705	22	
AVERAGE													

5.84

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

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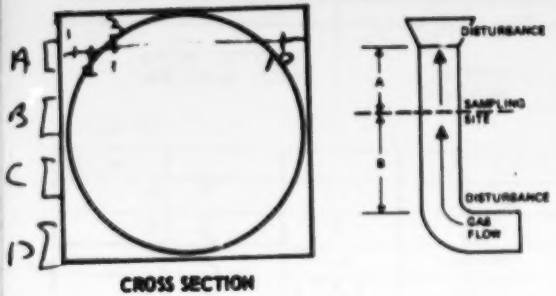
PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT L-4
DATE 7/12/78
LOCATION After Collecto
OPERATOR And - Davis
STACK NO. Boiler #4
RUN NO. Combination
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 86
BAROMETRIC PRESSURE 29.36
ASSUMED MOISTURE, % 6
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/8
STACK DIAMETER, in. 24x48
PROBE HEATER SETTING Full
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.91
C FACTOR .146
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
A 5	5	-.55	501	.08	1.0	1.0	1009.12	109		244	57	.5	
6	5	"	510	.13	1.6	1.6	12.8	109		242	54	1.0	
7	5	"	515	.15	2.0	2.0	15.75	112		256	53	2.0	
8	5	"	512	.16	2.9	2.1	19.7	114		261	51	2.5	
9	5	"	506	.18	2.4	2.4	24.09	115		268	51	3.0	
10	5	"	504	.19	2.6	2.6	28.6	116		266	52	3.5	
	30	-.55	3048	2.277	11.7			675		1537	518	12.5	
C 1	5	-.55	500	.12	1.6	1.6	1035.29	112		242	55	2.5	
2	5	"	502	.10	1.4	1.4	1037.01	113		248	53	2.0	
3	5	"	503	.12	1.6	1.6	40.40	114		257	53	2.5	
4	5	"	511	.14	1.9	1.9	44.11	116		256	52	2.5	
5	5	"	513	.16	2.2	2.2	48.11	117		263	52	3.0	
6	5	"	510	.16	2.2	2.2	52.7	115		250	54	3.0	
7	5	"	512	.20	2.7	2.7	56.65	118		263	52	4.0	
8	5	"	512	.21	2.9	2.9	61.43	120		268	53	4.0	
TOTAL	70	-.55	7111	5.366	28.2		66.44	1600		3584	745	36	
AVERAGE				☒									

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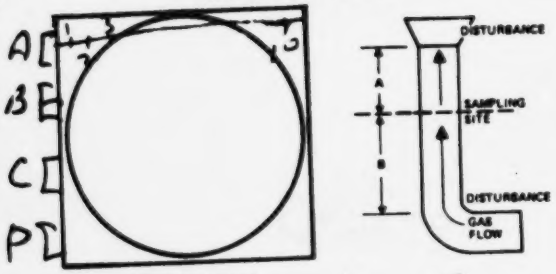
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION End 1215

PLANT L-4
DATE 7/12/78
LOCATION After Collector
OPERATOR And - Davis
STACK NO. Boiler #4
RUN NO. Certification Test
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 91
BAROMETRIC PRESSURE 29.36
ASSUMED MOISTURE, % 6
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/8"
STACK DIAMETER, in. 24 x 48
PROBE HEATER SETTING Ext
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.9
C FACTOR 1.46
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
C 9	5	-.55	509	.23	3.2	3.2	66.48	121		262	54	9.5	
10	5	"	502	.23	3.2	3.2	"	120		273	53	5.0	
	10	-.55	1011	.9592	6.4			241		433	107	9.5	
1													
D 1	5	-.55	490	.06	.83	.83	76.70	114		219	66	.5	
2	5	"	498	.09	1.2	1.2	79.41	115		243	64	2.5	
3	5	"	515	.09	1.2	1.2	82.60	115		243	63	2.5	
4	5	"	520	.10	1.35	1.35	85.90	118		244	66	2.5	
5	5	"	510	.13	1.8	1.8	—	119		248	69	3.0	
6	5	"	507	.19	2.6	2.6	93.16	119		244	66	4.0	
7	5	"	495	.20	2.8	2.8	97.86	121		253	65	5.0	
8	5	"	496	.23	3.2	3.2	102.73	123		257	68	5.5	
9	5	"	488	.24	3.4	3.4	108.97	125		259	70	6.0	
10	5	"	480	.20	2.8	2.8	113.4	127		272	73	5.5	
			1003	4.7807	27.55		118.23	1437		2917	777	1163	
TOTAL	800		20206	15.5417	83.38		165.05	4448		9946	2323	1043	
AVERAGE		-.55	505	0.158	.3885	2.08		111.2		249	58	2.6	

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VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	200	152	9		242
INITIAL	100	100	0		200
LIQUID COLLECTED	100	52	9		42
TOTAL VOLUME COLLECTED					203

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

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PARTICULATE LAB WORKSHEET

Site Desig. L 4 Date July 12, 78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O rinse after filter (water sol. only)	P-27	92.4151	92.4019	.0132
	P-28	94.1810	94.1689	.0121
	____	____	____	____
H_2O rinse before filter (water sol. only)	P-40	95.4367	95.3845	.0522
	____	____	____	____
Acetone rinse after filter	P-29	101.8675	101.8505	.0170
Acetone rinse before filter	P-38	91.5736	91.5173	.0563
	Filter #			
Impinger catch and H_2O rinse after filter (water insol. only)	39-.8	.08859	.08481	.00313
	45-.45	.09175	.09138	.00037
	45-.22	.08645	.08640	.00005
H_2O rinse before filter (water insol. only)	38-.8	.34785	.08665	.26120
	44-.45	.09398	.09225	.00173
	46-.22	.08582	.08520	.00062
Test Filter	109	1.97289	.64683	1.32606
			TOTAL MASS	1.743.96

Dry Gas Meter Vol. (ft^3)

Final	118.23
Initial	953.18
Δ DgV	165.05

Imp. Water Vol. (Ml.)

1	2	3	4
200	152	9	242
100	100	0	200
100	52	9	42
		Total H_2O	203

IMPACTOR DATA SHEET

Site Desig. L4 Date July 4, 78

Sample Location After Collector Sample No. _____

P_b 29.40 Assmd Moisture 6% Noz. Dia. 3/8"

Stk. Dia 24.48 Sample Point _____ Sample Time 60

Stat P -.55 "H_2O Pitot Tube ΔP .129 "H_2O Stk T 472 °F

ΔH Orfice 1.37 "H_2O Liquid Col. 44 ml Sample Vol. 34.35 scf

D_p	Net Wt. (milligm)	Percent
125	84.36	21.98
45	51.52	13.42
30	51.26	13.36
20	61.47	16.02
10	11.36	2.96
7.15	13.46	3.51
4.82	10.5	2.74
3.26	10.48	2.73
2.06	10.76	2.8
.99	13.14	3.42
.58	16.85	4.39
.35	48.64	12.67
Total	383.8 Milligrms	

IMPACTOR DATA SHEET

Site Desig. L4 Date July 11, 78

Sample Location Before Collector Sample No. _____

P_b 29.36 "Hg Assmd Moisture 6% Noz. Dia. 3/8

Stk. Dia 12"-96" Sample Point _____ Sample Time 45 MIN

Stat P -.6 "H_2O Pitot Tube ΔP .1 "H_2O Stk T 554 °F

ΔH Orfice 1.2 "H_2O Liquid Col. 35 ml Sample Vol. 25.51 scf

D_p	Net Wt. (milligm)	Percent
125	86.12	29.37
45	33.65	11.48
30	30.78	10.50
20	44.5	15.18
9	13.68	4.67
7.04	14.82	5.06
4.74	9.73	3.32
3.20	7.23	2.47
2.02	6.87	2.34
.96	6.88	2.35
.55	8.57	2.92
.33	30.36	10.36
Total	293.19 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L4 Date July 11, 78

Sample Location Before Collector Sample No. _____

P_b 29.36 "Hg Assmd Moisture 6% Noz. Dia. 1/2

Stk. Dia 12"-96 Sample Point _____ Sample Time 50 min

Stat P -.6 "H_2O Pitot Tube ΔP .09 "H_2O Stk T 562°F

ΔH Orfice 3.5 "H_2O Liquid Col. 58 ml Sample Vol. 43.62 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
125	—	—	2.3	4.47
63	.0106	.0082	3.5	6.8
30.84	.0133	.0106	2.7	5.24
27.01	.0199	.0133	6.6	12.82
18.73	.0266	.0199	6.7	13.01
12.7	.0431	.0266	16.5	32.04
3.84	.0513	.0431	8.2	15.92
2.48	.0563	.0513	5	9.71
		Total	51.5 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L4 Date July 12, 78

Sample Location After Collector Sample No. _____

P_b 29.36 Assmd Moisture 6% Noz. Dia. 3/8"

Stk. Dia 24"-48" Sample Point _____ Sample Time 202 MIN

Stat P -.55 "H_2O Pitot Tube ΔP .129 "H_2O Stk T 493 °F

ΔH Orfice 1.66 "H_2O Liquid Col. 189 ml Sample Vol. 142.96 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
125	–	–	815.4	36.8
63.0	.6586	.6074	565.2	25.5
30.89	.7641	.6586	105.5	4.76
27.01	1.0170	.7641	252.9	11.41
18.73	1.1992	1.0170	182.2	8.22
12.7	1.3471	1.1992	147.9	6.67
6.8	1.4492	1.3471	102.1	4.61
3.84	1.4808	1.4492	31.6	1.43
2.48	1.4937	1.4808	12.9	.58
		Total	2215.8 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-4
DATE July 11-12, 1928
~~PROJECT NO. G.S.A.~~ _____
BOILER NO. 4
DURATION OF TEST _____

FACTORS
INTEGRATOR X 350
CHART X 1000
(FACTOR AT 115 PSIG)
CORRECTION FACTOR @ 135 PSIG = 0.89

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART From Intgr.	SUPER HEAT TEMP. Across	FEED WATER ECON. TEMP. In	FEED WATER ECON. TEMP. Out	FLUE GAS TEMP. ECON. OUT	COMB. AIR TEMP.	GATE NE STM. COND. N-W	PRESSURES DRUM	PRESSURES HPR.	F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN. —	DUST COLL. IN	DUST COLL. OUT	OVER FIRE AIR STACK DE-N.	CO_2	O_2	CO	REMARKS
	July	11, 1928	Stack	Traverse	/	Particulate		Sale	Test																
AM 0900		16.8	334243.5	10.6	+0.5	-	465	70	5½	-	-	265	0.9	0.3	-	-	-	-	0.18	0.6	0.8	2.4	-	-	-	0830 Flue Ashes, Below Tubes going to the West Stack. To Atmosphere.
0930		9.0	334285.5	-	-0.5	498	490	70	5½	135	136	260	0.6	0.0	-	-	-	-	0.16	0.3	0.8	2.6	-	-	-	0900 Changing to Conservation Coal
1000		20.0	334308.0	18.0	+1.5	610	530	71	5⅝	135	128	265	0.8	-	-	-	-	-	0.17	0.5	1.8	2.5	-	-	-	1045 Start Traverse
1030		21.0	334335.0	15.8	0	616	540	70	6	138	130	262	0.9	-	-	-	-	-	0.19	0.5	1.9	2.5	8.0	11.5	0	
1100		22.5	334369.5	14.6	0	616	548	71	6⅛	135	130	262	0.6	-	-	-	-	-	0.15	0.5	1.9	2.5	9.3	10.0	0	
1130		22.5	334392.0	13.6	0	613	530	71	6⅛	135	128	262	0.7	0.1	-	0.15	-	-	0.05	0.4	1.6	2.5	10.5	8.7	0	
1200		22.0	334414.2	13.0	0	613	535	74	6⅛	135	128	262	0.6	0.1	-	0.05	-	-	0.10	0.4	1.9	2.6	11.4	7.9	0	
1230		22.8	334437.5	11.5	0	613	535	74	6⅛	135	128	265	Gate	Sale	Sale	Analysis		-	-	0.5	1.7	2.6	11.9	7.0	0	
PM 1230		21.5	334459.6	18.0	+0.5	613	544	73	6⅛	135	128	265	0.7	-	0.4	-	-	-	0.09	0.4	1.7	2.8	12.2	6.5	0	
1300		22.0	334480.7	13.5	+0.5	613	540	74	6⅛	138	130	260	0.7	-	0.9	-	-	-	0.05	0.3	1.2	2.6	11.8	7.1	0	
1330		19.2	334710.5	7.5	-0.5	613	540	74	6⅛	138	130	260	0.9	-	0.3	-	-	-	0.08	0.3	1.2	1.6	11.3	7.7	0	
1400		20.5	334727.5	18.6	0	613	530	74	6⅛	135	128	265	0.9	-	0.3	-	-	-	0.15	0.4	1.4	1.5	10.8	8.3	0	
1430		21.0	334745.5	16.0	0	613	535	74	6⅛	135	130	260	0.5	-	0.3	-	-	-	0.14	0.4	1.6	1.5	11.0	7.8	0	
1500		21.0	334764.5	14.7	+0.5	613	535	75	6⅛	138	134	262	0.7	-	0.5	-	-	-	0.10	0.4	1.6	1.6	11.0	7.8	0	
1530		21.6	334783.5	15.3	0	613	480	75	6⅛	138	130	262	0.7	-	0.4	-	-	-	0.09	0.4	1.8	1.6	10.1	8.5	0	1545 End Tests Reduce Load
1545		21.0	334804.5	15.0	0	613	545	75	6⅛	135	128	262	0.8	-	0.5	-	-	-	0.08	0.4	1.8	1.6	10.1	8.5	0	
																						10.7	8.2	0	
Ave						613		73		136	129	259													

* NOTE: Flue gas taken at Boiler outlet and port location in Arrangement indicates that no air infiltration between these two points.

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-4
DATE JULY 11-12, 1978
~~PROJECT NO. E.S.A.~~ _____
BOILER NO. 4
DURATION OF TEST _____

FACTORS
INTEGRATOR X 3.50
CHART X 1000
(FACTOR AT 175 PSIG)
CORRECTION FACTOR @ 190 PSIG
= 0.92

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR	STEAM FLOW CHART	SUPER HEAT TEMP.	FEED WATER TEMP. @ ECON. INLET	FEED WATER TEMP. @ ECON. OUTLET	FLUE GAS TEMP. ECON. OUT	COMB. AIR TEMP.	GATE AIR DIST. SYSTEM DOWN-COMER	PRESSURES DRUM	PRESSURES H.P.R.	F. W. PRESS.	WIND BOX	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN. —	DUST COLL. IN —	DUST COLL. OUT —	SITE BAROM. STACK DEW. °R.	CO_2	O_2	CO	REMARKS
	JULY	11, 1978		PARTICULATE		EMISSION	/	PARTICLE	SIZE	TESTS																
AM 0730		23.0	39109.0	16.0	+1.0	413	540	64	6	198	193	650	0.7	0.1	0.9	—	—	—	0.16	0.9	4.0	4.8	12.2	6.9	0	0730 AIR PREHEAT HEADS 0758 - COLLECTOR HOPPER CLEANED.
0800	1470	22.5	39138.5	15.4	0	413	550	65	6	195	190	650	0.6	0.1	0.9	—	—	—	0.16	0.5	4.0	4.8	12.2	7.0	0	0800 STARTED COAL FEEDER
0830		23.7	39167.0	16.0	0	413	550	66	6	195	196	650	0.7	0.1	0.9	—	—	—	0.15	0.5	4.1	4.8	12.0	6.8	0	
0900		23.0	39190.5	15.5	-0.5	413	560	67	6	198	195	650	0.7	0.1	0.9	—	—	—	0.14	0.5	4.0	4.7	11.0	7.8	0	
0930	1480	20.9	39211.5	16.7	+0.5	413	550	69	6	198	193	650	0.9	0.1	0.5	—	—	—	0.17	0.6	4.1	4.7	9.2	9.6	0	
1000	1411	21.0	39258.0	15.6	+0.5	413	550	70	6	198	192	650	0.8	.01	.05	—	—	—	0.19	0.6	4.1	4.7	10.9	8.8	0	
1030	1454	21.5	39289.0	15.7	+0.5	413	550	24	6	198	196	650	0.6	0.1	0.35	—	—	—	0.18	0.6	4.1	4.7	9.8	9.0	0	
1100		22.0	39324.5	15.9	0	413	550	73	6	198	196	650	0.8	0.15	0.5	—	—	—	0.18	0.6	4.2	4.7	10.2	8.7	0	
1130	1426	21.5	39346.0	15.6	0	413	550	74	6	198	190	650	0.8	0.1	0.55	—	—	—	0.20	0.6	4.2	4.7	10.6	8.6	0	
1200	1491	22.0	39372.5	15.2	0	413	560	74	6	198	191	650	0.8	0.15	0.5	—	—	—	0.19	0.6	4.5	4.7	10.4	8.8	0	1139 CLEANED COAL HOPPER
1230	1007	22.0	39401.5	16.0	0	413	560	75	6	198	191	650	0.6	0.1	0.9	—	—	—	0.25	0.6	4.9	4.7	10.2	9.0	0	1200 REMOVED EXC AIR FROM COLLECTOR HOPPER
	-700																									W. SLURRY 12 GAL.
Tot	0.8 Sample					2.1		76		197	192	650											10.3	7.4	0	
Coal	2.1																									
PM 1300		22.0	39415.0	16.0	0	413	555	75	6	199	192	650	0.7	0.1	0.9				0.24	0.6	4.9	4.7	9.8	9.9	0	
1330		19.2	39434.5	15.0	0	413	550	75	6	198	191	650	0.6	0.1	0.9				0.19	0.6	4.0	4.7	10.4	8.6	0	
1400		20.0	39454.5	15.3	0	413	550	77	6	199	192	650	0.6	0.1	0.9				0.20	0.6	4.0	4.7	10.0	9.4	0	
1430		20.0	39474.0	15.4	0	413	550	77	6	197	192	650	0.6	0.1	0.35				0.25	0.6	4.0	4.7	10.6	8.6	0	
1500		20.9	39493.0	15.8	0	413	550	77	6	198	192	650	0.6	0.1	0.35				0.20	0.6	4.0	4.7	10.6	8.6	0	
1530		21.3	39505.0	15.9	0	413	550	77	6	197	191	650	0.7	0.1	0.9				0.25	0.6	4.3	4.7	9.6	9.6	0	END TESTING - REDUCE LOAD.
Ave						413		76		198	192	650											10.1	9.0	0	

SECTION 5.0

SITE L5 DATA

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BAHCO SIZE DATA SHEETS	50
BOILER SYSTEM TEST DATA SHEETS	51

Start Leak test = 0.015 @ 15" Hg 1/4

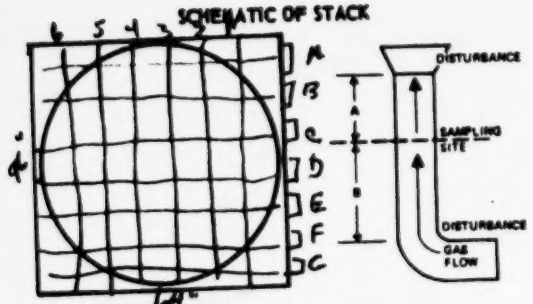
PARTICULATE FIELD DATA

PLANT L-5
DATE 11/16/78
LOCATION Breaching
OPERATOR Davis Anderson
STACK NO. Boiler #1
RUN NO. Certification Test
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 28.10
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/4"
STACK DIAMETER, in. 64" x 96"
PROBE HEATER SETTING Full
HEATER BOX SETTING 250°F

METER $\Delta H_@$ 1.74
C FACTOR 0.0092
PROCESS WEIGHT RATE

SCHEMATIC OF STACK



Start 8:50

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
A 1	5	-.62	411	.004		1.0	1.0	918.00	83		184	46	0.0	
2	5	"	435	.005		1.0	1.0	—	89		209	44	1.0	
3	5	"	460	.006		1.2	1.2	924 -	94		221	46	2.5	
4	5	"	464	.007		1.4	1.4	927 -	97		226	46	3.0	
5	5	"	458	.007		1.4	1.4	930	99		241	46	3.0	
6	5	"	446	.004	.4494	.8	.8	—	100		246	44	2.0	
			2673			6.8			592		1379	272	12.5	
B 1	5	"	385	.005		1.0	1.0	936.41	97		226	44	2.5	
2	5	"	404	.004		1.2	1.2	—	95		229	44	3.5	
3	5	"	401	.007		1.4	1.4	—	103		231	45	4.5	
4	5	"	400	.005		1.0	1.0	946 -	104		237	44	4.0	
5	5	"	410	.007		1.4	1.4	—	102		238	44	5.0	
6	5	"	426	.006	.4951	1.2	1.2	952	106		242	44	5.0	
			2422			7.2			613		1405	221	24.5	
C 1	5	"	380	.004		0.8	0.8	955.46	100		220	44	3.8	
TOTAL	65	—	5475		.9763	14.8			1275		2950	537	40.8	
AVERAGE		-.62												

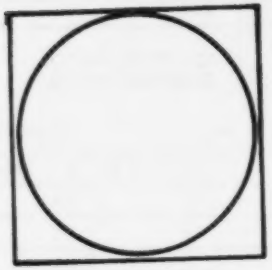
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL	100	100			200
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1				0	
2				0	
3				0	

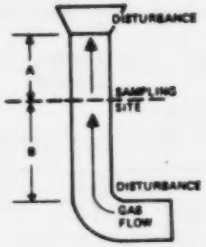
COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT L-5
DATE 11/16/78
LOCATION Bruceton
OPERATOR Davis - Anderson
STACK NO. Boiler #1
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 28.1
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/4"
STACK DIAMETER, in. 64" x 96
PROBE HEATER SETTING 250
HEATER BOX SETTING Full

METER $\Delta H_@$ 1.74
C FACTOR 0.0042
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
C 2	5	-.62	390	.006		1.2	1.2	—	103		234	42	6.0	
3	5	-.62	380	.005		1.0	1.0		103		238	42	6.0	
4	5	"	404	.005		1.0	1.0		106		241	40	6.0	
5	5	"	398	.005		1.0	1.0		107		240	42	7.0	
6	5	"	409	.006		1.2	1.2		107		238	43	8.0	
			1981		3671	59			528		1191	209	33	
D 1	5	"	398	.002		0.4	0.4	973.45	98		220	42	3.8	
2	5	"	380	.003		0.6	0.6	—	100		226	46	5.0	
3	5	"	379	.003		0.6	0.6		102		228	47	5.2	
4	5	"	399	.003		0.6	0.6		103		226	48	5.3	
5	5	"	414	.003		0.6	0.6		104		229	46	5.2	
E-#906	5	"	418	.004		0.8	0.8	984.7	104		229	44	7.0	
Start #2			2368	.0	3211	34		987.38	69.38	611	1358	273	31.9	
E 1	5	"	350	.007		0.4	0.4	988.50	98		200	44	2.0	
2	5	"	350	.002		0.4	0.4	—	100		220	44	2.0	
TOTAL	130		10524		13599	29.4			3612		5919	1107	109.6	
AVERAGE		-.62												

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

@ 15" Hg

COMMENTS:
After D6 Filter Changed
End Leak Test after D6 = 0.02 cfm
Start #2 : For Filter #2 = 0.013 "

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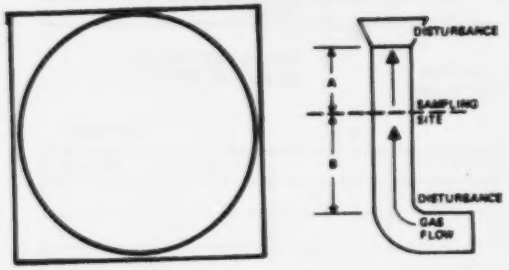
45

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT L-5
DATE 11/16/78
LOCATION Breaching
OPERATOR Anderson-Davis
STACK NO. Boiler #1
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 2
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/4
STACK DIAMETER, in. 64 x 96
PROBE HEATER SETTING 250
HEATER BOX SETTING Full

METER $\Delta H_@$ 1.74
C FACTOR 0.6042
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
E 3	5	-.62	346	.002		0.4	0.4	992.0	102		220	42	2.2	
4	5	"	346	.002		0.4	0.4	—	103		228	43	2.3	
5	5	"	364	.001		0.2	0.2	—	103		237	44	2.0	
6	5	"	404	.002		0.4	0.4	999.60	103		244	44	2.3	
			1406		.1688	1.4			11.1 .411		929	193	8.8	
E 1	5	- "	330	.001		0.2	0.2	1002.0	101		238	44	2.0	
2	5	"	330	.001		0.2	0.2	1003.6	102		248	44	2.0	
3	5	"	333	.001		0.2	0.2	—	102		252	44	2.0	
4	5	"	347	.001		0.2	0.2	6.55	101		254	44	2.0	
5	5	"	387	.001		0.2	0.2	8.20	101		251	44	2.0	
6	5	"	403	.002		0.4	0.4	—	101		255	44	2.4	
			2120		.2029	1.4			.608		1498	264	12.4	
G 1	5	"	330	.001		0.2	0.2	1011.29	.99		233	45	2.0	
2	5	"	310	.001		0.2	0.2	12.9	100		251	45	2.0	
3	5	"	293	.001		0.2	0.2	14.2	100		249	45	2.0	
TOTAL	195		14965		2.2239	28			39.30		9079	1679	136.8	
AVERAGE		-.62												

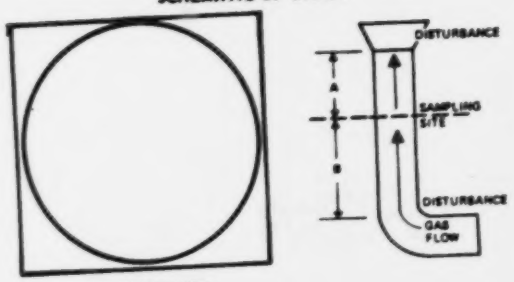
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:
A ΔP_s reading of 0.001 is a slight positive reading on magnehelic (0 - .25")

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT L-5
DATE 11/16/78
LOCATION Breechiny
OPERATOR Davis Anderson
STACK NO. Boiler #1
RUN NO. Certification Test
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE —
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 3/4"
STACK DIAMETER, in. 64 x 96
PROBE HEATER SETTING Full
HEATER BOX SETTING 250°F

METER $\Delta H_@$ 1.74
C FACTOR 1.0092
PROCESS WEIGHT RATE —

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
C 4	5	-.62	293	.001		0.2	0.2	15.7	100		242	45	2.2	
5	5	"	313	.001		0.2	0.2	—	101		243	45	2.2	
6	5	"	297	.001		0.2	0.2	18.7	101		245	45	2.2	
			903		.0949	.6			302		730	135	6.6	
H 1	5	"	374	.001		0.2	0.2	19.94	98		234	46	2.3	
2	5	"	269	.001		0.2	0.2	21.4	99		249	46	2.3	
3	5	"	264	.001		0.2	0.2	—	100		237	47	2.3	
4	5	"	310	.001		0.2	0.2	24.3	100		233	46	2.3	
5	5	"	260	.001		0.2	0.2		100		230	46	2.3	
6	5	"	288	.001		0.2	0.2		100		234	46	2.3	
						1.2		1028.735	599					
								26.735						
TOTAL	240		17533		2.5084	2.9.8		107.215	4829		11226	2091	157.2	
AVERAGE		-.62	365	.0027	0.05225	.621			101		234	44	3.3	

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VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	165	115	1		218
INITIAL	100	100	0		200
LIQUID COLLECTED	65	15	1		18
TOTAL VOLUME COLLECTED					99

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

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PARTICULATE LAB WORKSHEET

Site Desig. L-5 Date Nov 11, 78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O rinse after filter (water sol. only)	A-1	95.3894	95.3824	.0060
	A-2	94.5441	94.5415	.0026
	____	____	____	____
H_2O rinse before filter (water sol. only)	A-3	92.2371	92.1945	.0426
	____	____	____	____
Acetone rinse after filter	A-5	36.10521	36.0893	.01591
Acetone rinse before filter	A 4	36.3663	36.2961	.07026
	Filter #			
Impinger catch and H_2O rinse after filter (water insol. only)	55-.8	.08551	.08506	.00045
	60-.45	.09323	.09323	0
	65-.22	.10876	.10876	0
H_2O rinse before filter (water insol. only)	54-.8	.21184	.07505	.13679
	59-.45	.09319	.09319	0
	66-.22	.10876	.10972	0
Test Filter	117	1.19219	.67590	.51629
	116	.78488	.67094	.11394
			TOTAL MASS	.90609

Dry Gas Meter Vol. (ft^3)

Final	025.715
Initial	918.00
Δ DgV	107.215

Imp. Water Vol. (Ml.)

1	2	3	4
165	115	1	218
100	100	0	200
65	15	1	18
	Total H_2O		99

IMPACTOR DATA SHEET

Site Desig. LS Date Nov 15,78

Sample Location_____ Sample No._____

P_b 28.0 Assmd Moisture 3% Noz. Dia. 3/4"

Stk.Dia 64-96 Sample Point_____ Sample Time 45 MIN

Stat P -.62 "H_2O Pitot Tube ΔP .008 "H_2O Stk T 372 °F

ΔH Orfice 1.4 "H_2O Liquid Col. 16 ml Sample Vol. 27.31 scf

D_p	Net Wt. (milligm)	Percent
125	47.25	26.29
60	11.54	6.42
45	6.74	3.75
30.0	5.94	3.31
17.31	14.15	7.87
11.35	12.5	6.96
7.04	12.99	7.23
4.75	4.9	2.73
3.21	4.79	2.67
2.04	5.38	2.99
.98	6.73	3.75
.57	13.16	7.32
.36	33.66	18.73
Total	179.73 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L 5 Date Nov 15, 78

Sample Location _____ Sample No. _____

P_b 28.0" Hg Assmd Moisture 3 Noz. Dia. 3/4

Stk. Dia 64"-96" Sample Point _____ Sample Time 144 MIN

Stat P -.62 "H_2O Pitot Tube ΔP .0047 "H_2O Stk T 369 °F

ΔH Orfice .979 "H_2O Liquid Col. 35 ml Sample Vol. 70.69 scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	_____	_____	417.67	54.67
60	_____	_____	109.44	14.32
45	_____	_____	30.2	3.95
34.53	_____	_____	16.1	2.11
27.01	_____	_____	31.2	4.08
18.73	_____	_____	38.7	5.07
12.7	_____	_____	37.7	4.93
6.8	_____	_____	30.5	3.99
3.48	_____	_____	3.94	.51
2.48	_____	_____	48.6	6.36
		Total	764.01 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____

LOCATION Site L-5

DATE Nov. 15, 1928

~~PROJECT NO. C.G.A.~~ _____

BOILER NO. 1

DURATION OF TEST _____

FACTORS

INTEGRATOR x 500

CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART FLOW	STEAM FLOW INTEGRATOR CHART TOTAL	SUPER HEAT TEMP. AIR FLOW	FEED WATER TEMP. ECON. IN	FEED WATER TEMP. ECON. OUT	FLUE GAS TEMP. ECON. OUT	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES HPR.	F. W. PRESS.	WIND BOX	ZONE OVER FIRE	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN.	SUPER HEAT GAS COOL. PASS IN	DUST COLL. OUT	STACK OUT R. Co.	CO_2	O_2	CO	REMARKS
		STACK TRAVERSE / PARTICULATE SIZE TESTS											+	+					—	—						
AM 11:30	—	23.5	36696	16.5	431	—	510	78	—	150	198	185	2.0	0.6	—	—	—	—	0.20	0.25	—	19.0	9.2	10.4	0	8 AM - PNL ASSY
12:00	—	23.0	36761	17.0	433	—	540	78	—	150	198	190	1.9	1.1	—	—	—	—	0.10	0.35	—	11.5	9.7	9.5	0	ALUM TUBES
PM 12:30	—	4.0	36799	22.0	433	—	540	76	—	150	198	189	5.0	9.3	—	—	—	—	0.0	0.37	—	9.5	6.7	12.8	0	11:40 - INC. LOAD
1:00	—	22.0	36783	23.0	433	—	540	76	—	150	198	186	2.4	0.9	—	—	—	—	0.25	0.37	—	10.5	9.0	10.9	0	CONTROL - AIR ADJ. / FUEL MANUAL
1:30	—	18.0	36811	23.0	434	—	495	76	—	150	199	185	1.3	1.3	—	—	—	—	0.19	0.30	—	14.5	10.6	9.8	0	1:45 LOWERED FUEL ADJ.
2:00	—	23.6	36835	19.5	433	—	530	76	—	150	199	185	3.0	2.6	—	—	—	—	0.08	0.50	—	9.7	8.7	10.5	0	2:00 CONTROL - FUEL AUTO
2:30	—	24.5	36869	23.0	434	—	530	76	—	150	198	186	3.0	1.9	—	—	—	—	0.33	0.45	—	10.2	9.8	10.1	0	3:00 ADJUSTED AIR - LEANER
3:00	—	24.5	36890	20.5	434	—	515	76	—	150	198	186	2.6	1.7	—	—	—	—	0.21	0.30	—	12.0	8.7	10.5	0	FUEL ADJ.
3:30	—	23.0	36903	17.0	434	—	500	75	—	150	198	186	1.7	1.6	—	—	—	—	0.15	0.30	—	10.8	10.5	9.0	0	3:00 ADJ. LEAN
4:00	—	21.0	36918	18.0	434	—	510	75	—	150	198	185	3.6	2.8	—	—	—	—	0.25	0.45	—	22.0	8.3	11.2	0	
4:30	—	16.0	36935	15.0	434	—	520	75	—	150	198	183	2.8	2.0	—	—	—	—	0.25	0.34	—	9.0	8.5	10.7	0	STACK NO. 1, OR 20 ft.
5:00	—	16.5	37003	16.5	434	—	460	75	—	150	198	189	0	0	—	—	—	—	0.45	0.53	—	9.2	9.2	10.1	0	DENSITY, EXCEPT 1/2 OR 20 ft WHEN CLEARING
AM.	—	—	—	—	431	—	—	75	—	150	198	184	—	—					—	—		11.5	9.0	10.9	0	FIRE.

WEATHER - CLEAR WITH RAIN 10 PM
HIGH - 50°F
LOW - 38°F

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site I-5
DATE Nov 16, 1978
~~PROJECT NO. G.G.A.~~ _____
BOILER NO. 1
DURATION OF TEST _____

FACTORS
INTEGRATOR x 500
CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART From Integ.		SUPER HEAT TEMP. Air Flow	FEED WATER TEMP. @ SOOH IN	OUT	FLUE GAS TEMP. Econ Out	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	HPR.	F. W. PRESS.	WIND BOX +	ZONE over → Furn −	ZONE 2	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. Last IN	DUST COLL. OUT	STACK Last Econ. OUT A. Htr.	BREECHING CO_2	BREECHING O_2	BREECHING CO	REMARKS
	PARTICULATE EMISSION TEST												+	+					—	—						8:00 FULL ASSIST; BLOWDOWN. 9:00 FULL BOILER LOAD
AM 8:30	880	20.0	37461	16.0	230	—	490	23	—	150	197	185	0.8	0.3	—	—	—	—	0.15	0.23	—	13.4	10.8	8.6	0	8:30 START TEST.
9:00	880	19.5	37487	21.0	230	—	530	24	—	150	197	185	2.5	1.9	—	—	—	—	0.0	0.15	—	10.6	8.1	11.3	0	8:35 COAL HOPPER LEVEL.
9:30	850	20.7	37519	15.0	230	—	490	24	—	150	197	185	2.5	1.6	—	—	—	—	0.20	0.25	—	14.1	9.5	9.9	0	9:45 LOWER FUEL BED.
10:00	840	22.0	37542	17.0	230	—	490	24	—	150	197	185	1.8	0.8	—	—	—	—	0.10	0.20	—	14.0	9.6	10.0	0	10:10 TEAR FIRE
10:30	840	21.5	37571	18.5	230	—	490	24	—	150	197	185	1.6	1.3	—	—	—	—	0.0	0.20	—	13.6	9.2	10.2	0	11:00 DROP ASHES -
11:00	860	21.0	37598	15.0	230	—	490	24	—	150	197	183	2.7	1.6	—	—	—	—	0.20	0.90	—	14.3	9.8	9.7	0	LOWER FUEL BED.
11:30	890	21.0	37627	18.0	230	—	510	24	—	150	197	185	2.6	0.7	—	—	—	—	0.15	0.35	—	10.4	8.8	10.7	0	2:00 COAL HOPPER LEVEL
12:00	880	22.5	37654	19.0	230	—	490	23	—	150	197	186	3.0	1.2	—	—	—	—	0.13	0.35	—	14.5	9.5	9.8	0	END TEST
PM 12:30	870	21.0	37677	17.0	230	—	490	23	—	150	197	185	1.0	0.4	—	—	—	—	0.10	0.18	—	14.1	9.6	9.8	0	COMBUSTION CON-TROLS
1:00	870	21.0	37705	16.0	230	—	495	23	—	150	197	183	2.5	0.6	—	—	—	—	0.38	0.42	—	13.5	8.6	10.9	0	FUEL AUTOMATIC.
1:30	880	22.0	37734	19.0	230	—	490	68	—	150	197	184	3.0	1.5	—	—	—	—	0.15	0.20	—	14.6	11.8	2.7	0	
2:00	830	21.0	37757	22.0	230	—	490	66	—	150	197	185	1.9	0.7	—	—	—	—	0.0	0.22	—	12.6	10.0	9.9	0	STACK No. 1, 60 20%
2:30	880	18.0	37773	18.0	230	—	515	66	—	150	197	186	1.7	0.9	—	—	—	—	0.20	0.35	—	12.9	8.7	10.6	0	DENSITY CHECK 1
	880																									60 20% WITH CLEANING
Ave.	16,180	—	—	—	230	—	—	71	—	150	197	185	—	—					—	—		13.2	9.5	9.9	0	FIRE.
																										WEATHER - CLOUDY
	COAL WEIGH LARRY			—	16,180 LB																					HIGH - 46°F
	SCALE CORRECTION				- 135																					LOW - 36°F
					16,039																					
	LESS COAL SAMPLE				- 180																					
	COAL BURNED				16,039 LB																					

SECTION 6.0

SITE L6 DATA

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PARTICULATE LAB WORKSHEET	57
IMPACTOR DATA SHEETS	58
BAHCO SIZE DATA SHEETS	59
BOILER SYSTEM TEST DATA SHEETS	60

Start Leak Test = .007 cfm @ 15" Hg. 1/3

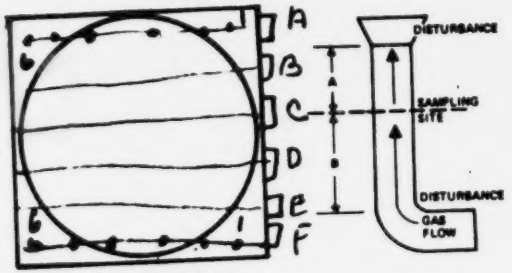
PARTICULATE FIELD DATA

PLANT L-6
DATE 12/6/78
LOCATION Breaching
OPERATOR Davis - Anderson
STACK NO. Boiler No 1
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 72
BAROMETRIC PRESSURE 28.42
ASSUMED MOISTURE, % 5%
PROBE LENGTH, in. 120"
NOZZLE DIAMETER, in. 3/4"
STACK DIAMETER, in. 11' X 6'
PROBE HEATER SETTING Exit
HEATER BOX SETTING 250°

METER $\Delta H_@$ 1.74
C FACTOR .0078 - .0085
PROCESS WEIGHT RATE

SCHEMATIC OF STACK



CROSS SECTION

Start 1025

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	#1 STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	#2 GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	#3 SAMPLE BOX TEMPERATURE °F	#4 TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
A-6	5 min	-.48	443	.018		3.4	3.4	157.22	71		206	69	3	
5	"	"	450	.02		3.7	3.7	—	82		208	70	4	
4	"	"	453	.02		3.7	3.7	—	87		228	70	4.5	
3	"	"	450	.021		3.9	3.9	172.8	95		247	70	5.0	
2	"	"	449	.02		3.7	3.7	—	98		246	70	4.5	
1	"	"	430	.015		2.8	2.8	184.00	101		247	70	3.0	
			2675		.8158		2.3			539	1382	419	24	
B 6	5 min	-.48	420	.018		3.5	3.5	188.94	92		215	71	4.0	
5	"	"	433	.018		3.5	3.5	194.3	98		229	65	4.0	
4	"	"	427	.017		3.3	3.3	199.6	102		239	62	3.5	
3	"	"	420	.015		3.0	3.0	204.7	103		248	60	3.0	
2	"	"	400	.011		2.2	2.2	209.7	106		248	61	2.2	
1	"	"	370	.007		1.5	1.5	214.0	106		245	61	2.0	
			2470		.7097		17	217.73		609	1424	328	19	
TOTAL	60		5145		1.5255		38.3	60.51		1148	2806	997	43	
AVERAGE		-.48												

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	1078	113			226.9
INITIAL	900	100	0	-	200
LIQUID COLLECTED	178	13	5		26.9

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

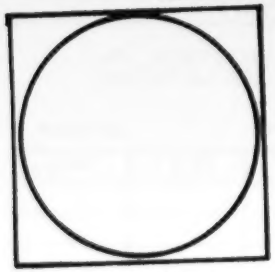
COMMENTS:

26.9
13
7.3
52.4

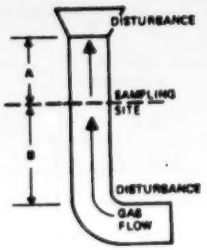
54

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT L-6

DATE 12/6/78

LOCATION Breeding

OPERATOR A and SD

STACK NO. Boiler #1

RUN NO. Centrifugation

SAMPLE BOX NO. RAC

METER BOX NO. RAC

AMBIENT TEMPERATURE 75°

BAROMETRIC PRESSURE 28.46

ASSUMED MOISTURE, % 5%

PROBE LENGTH, in. 120

NOZZLE DIAMETER, in. 3/4

STACK DIAMETER, in. 11'X6'

PROBE HEATER SETTING Full

HEATER BOX SETTING 250

METER ΔH_g 1.7V

C FACTOR .0078 - .0085

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (Tm_{IN}), °F	OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
C 6	5 min	-.48	250	.002		.50	.50	217.73	97		214	67	0.0	
5	"	"	262	.003		.71	.71	219.50	97		225	59	9.5	
4	"	"	255	.002		.50	.50	222.4	98		224	58	0.0	
3	"	"	236	.002		.50	.50	224.5	100		239	60	0.0	
2	"	"	230	.002		.50	.50	226.65	100		244	62	0.0	
1	"	"	220	.001		.26	.26	228.75	101		263	62	0.0	
			1452		.2453		2.97			593	1409	368	.5	
D 6	5 min	-.48	170	.001		.28	.28	230.42	94		252	72	0.0	
5	"	"	176	.001		.28	.28	232.00	95		280	69	0	
4	"	"	180	.001		.28	.28	233.6	96		270	66	0	
3	"	"	178	.001		.28	.28	235.2	97		257	64	0	
2	"	"	182	.001		.28	.28	236.8	98		253	63	0	
1	"	"	160	.001		.28	.28	238.4	100		246	62	0	
			1046		.1897		4.68	240.10		580	1358	396	0	
			2498		.4530		4.65	22.37		1173	2967	764	.5	
TOTAL	120 min		9643		1.9905		42.95	82.88		2321	5773	1461	48.5	
AVERAGE		-.48												

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:
Effective Stack Dimension
10' X 6'

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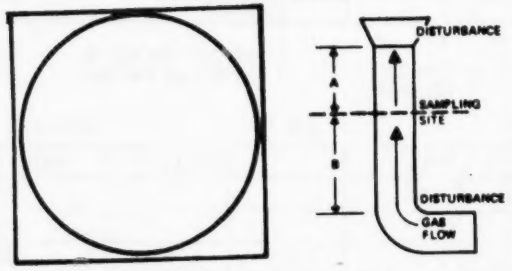
Stop-Leak Test = .008 cfm @ 15" Hg

3/3

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

Stop 1345

PLANT L-6
DATE 12/6/78
LOCATION Breaching
OPERATOR Dwoir - And
STACK NO. Boiler #1
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. RAC

AMBIENT TEMPERATURE 72
BAROMETRIC PRESSURE 28.46
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 120"
NOZZLE DIAMETER, in. 3/4"
STACK DIAMETER, in. —
PROBE HEATER SETTING Full
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.74
C FACTOR
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (Tm_{IN}), °F	OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
E 6	5 min	-.48	158	.001		.28	.28	240.10	96		227	72	0.0	
5	"	"	167	.001		.28	.28	241.70	96		246	69	0.0	
4	"	"	160	.001		.28	.28	243.3	97		242	68	0.0	
3	"	"	154	.001		.28	.28	245.0	98		245	67	0.0	
2	"	"	150	.001		.28	.28	246.6	99		246	66	0.0	
1	"	"	148	.001		.28	.28	248.2	99		246	67	0.0	
			937		.1897		1.68	249.92		583	1453	409	0.0	
			7643		1.9905		42.95	9.82		2321	5773	1561	43.5	
								82.58						
TOTAL	150		8580		2.1802		44.63	92.70		2906	7226	1970	43.5	
AVERAGE		-.48	286		.0727		1.49			97	241	66	1.45	

.0053

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:
Orsat
1330 Port B

56

PARTICULATE LAB WORKSHEET

Site Desig. L6 Date Dec 6,78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O rinse after filter (water sol. only)	J 1	90.2246	90.2094	.0152
	J 2	96.5627	96.5571	.0051
	____	____	____	____
H_2O rinse before filter (water sol. only)	J 3	99.2833	99.2084	.0749
	____	____	____	____
Acetone rinse after filter	J 4	91.6713	91.6619	.0094
Acetone rinse before filter	J 5	91.6932	91.6320	.0612
	Filter #			
Impinger catch and H_2O rinse after filter (water insol. only)	52-.8	.07565	.07565	0
	57-.45	.09380	.09380	0
	68-.22	.10720	.10720	0
H_2O rinse before filter (water insol. only)	53-.8	.13120	.07685	.05435
	58-.45	.09285	.09285	0
	67-.22	.10900	.10900	0
Test Filter	118	0.93721	0.68850	.23371
			TOTAL MASS	.45459

Dry Gas Meter Vol. (ft^3)

Final	249.92
Initial	157.22
Δ DgV	92.7

Imp. Water Vol. (Ml.)

1	2	3	4
107.5	113	5	226.9
100	100	0	200
7.5	13	5	26.9
	Total H_2O		52.4

IMPACTOR DATA SHEET

Site Desig. L6 Date Dec 5,78

Sample Location _____ Sample No. _____

P_b 28.16 Assmd Moisture 3% Noz. Dia. 3/4"

Stk. Dia 120" -72" Sample Point _____ Sample Time 30 min

Stat P -.45 "H_2O Pitot Tube ΔP .007 "H_2O Stk T 281 °F

ΔH Orfice 1.78 "H_2O Liquid Col. 12.39 ml Sample Vol. 20.55 scf

D_p	Net Wt. (milligm)	Percent
125	2.5	5.47
60	.83	1.82
45	.45	.98
30	0	0
16.74	7.06	15.45
10.98	3.11	6.80
6.82	2.25	4.92
4.60	1.48	3.24
3.12	2.13	4.66
1.98	2.17	4.75
.96	2.02	4.42
.57	10.53	23.04
.35	11.18	24.46
Total	45.71 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L 6 Date Dec 5,78

Sample Location _____ Sample No. _____

P_b 28.46 "Hg Assmd Moisture 5% Noz. Dia. 3/4

Stk. Dia 10'-6' Sample Point ____ Sample Time ____

Stat P -.48 "H_2O Pitot Tube ΔP _____ "H_2O Stk T ____ °F

ΔH Orfice ____ "H_2O Liquid Col. 43 ml Sample Vol. _____ scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	_____	_____	57.96	43.47
60	_____	_____	24.99	18.74
45	_____	_____	6.1	4.57
34.53	_____	_____	1.8	1.35
27.01	_____	_____	4.0	3.0
18.73	_____	_____	4.2	3.15
12.7	_____	_____	4.2	3.15
6.8	_____	_____	4.1	3.08
3.81	_____	_____	10.4	7.80
2.49	_____	_____	15.6	11.70
		Total	133.35 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-6
DATE December 6, 1976
~~PROJECT NO. E.C.A.~~ _____
BOILER NO. 1
DURATION OF TEST _____

FACTORS
INTEGRATOR x 1000
CHART x 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART Totes. Flow	SUPER HEAT TEMP. Airflow	FEED WATER TEMP. ECON IN	FEED WATER TEMP. ECON OUT	FLUE GAS TEMP. ECON OUT	COMB. AIR TEMP. Amb.	A.A.T. DIFF. ECON OUT-IN	PRESSURES DRUM	PRESSURES HPR.	F. W. PRESS.	WIND BOX	ZONE Flow ±	ZONE dP mm B	ZONE 3	ZONE 4	ZONE 5	BURN.	DUST COLL. IN	DUST COLL. OUT	STACK DE N. R.	Boiler Outlet CO_2	Boiler Outlet O_2	Boiler Outlet CO	REMARKS
		STACK TRAVERSE / PARTICULATE SIZE TESTS										±	−	−											
12:00		9941.9	11.0	14.0	4.60	−	960	70	−	112	111	116	0.7	0.10	0.38	−	−	−	−				10.6	8.9	0	12 NOON - POOR READING.
PM 12:30		9942.7	15.0	16.0	4.78	−	960	70	−	112	111	116	1.0	0.10	0.43								11.2	7.8	0	BLOW SOOT
1:00		9943.6	15.5	17.0	4.78	−	930	70	−	112	110	116	0.7	0.12	0.30								12.0	6.8	0	
1:30		9944.6	16.5	16.5	4.79	−	980	70	46	111	109	116	0.9	0.12	0.38								12.6	6.0	0	CONTROLS - AIR AND
2:00		9945.8	17.0	15.0	4.79	−	960	69	−	112	109	115	0.7	0.11	0.35								10.7	8.9	0	OUTLET DAMPER ADJ.
2:30		9947.1	19.0	13.5	4.79	−	930	69	−	112	110	115	0.6	0.10	0.30								11.2	7.8	0	STOKER - MANUAL
3:00		9948.6	17.0	15.0	4.79	−	925	69	49	112	110	115	0.6	0.10	0.32								10.8	8.2	0	
3:30		9950.2	16.0	16.5	4.80	−	950	69	41	111	109	117	0.9	0.10	0.42								10.9	8.1	0	STACK - CLEAR
4:00		9951.8	17.0	16.0	4.85	−	960	70	−	111	108	116	0.9	0.11	0.40								11.6	7.3	0	TV LIGHT HALF
4:30		9953.6	16.5	16.5	4.83	−	960	70	39	109	106	113	1.1	0.13	0.55								10.8	8.9	0	
5:00		9955.3	17.0	16.5	4.83	−	961	70	−	110	107	116	1.0	0.11	0.50								11.1	7.9	0	
5:30		9956.9	17.5	17.5	4.80	−	970	69	−	109	105	116	1.0	0.13	0.45								12.0	6.1	0	
5:50		9957.9	18.0	17.5	4.80	−	977	68	−	108	109	116	1.1	0.12	0.49								11.6	6.6	0	
AVG.		−	−	−	4.79		−	69	−	111	110	116	−	−	−								11.3	7.6	0	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-6
DATE December 6, 1977
~~PROJECT NO. O.S.A.~~ _____
BOILER NO. 1
DURATION OF TEST _____

FACTORS
INTEGRATOR X 1000
CHART X 1000

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART		SUPER HEAT TEMP. Avg/Loop	FEED WATER TEMP. @ ECON IN	FEED WATER TEMP. @ ECON OUT	FLUE GAS TEMP. ECON OUT	COMB. AIR TEMP.	L.A.T. DET. STM. COND. 10-16	PRESSURES DRUM	PRESSURES HDR.	F. W. PRESS.	WIND BOX	BOILER FURN. →	BOILER FURN. ←	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. IN	DUST COLL. OUT	STACK DE N. R.	BOILER EFFIC. CO_2	BOILER EFFIC. O_2	BOILER EFFIC. CO	REMARKS
	PARTICULATE EMISSION / PARTICULATE SIZE TESTS													→	←	←										
AM 9:30		8580.3	14.5	14.0	415	–	432	79	39	111	108	116	0.7	0.12	0.35	–	–	–	–				12.0	8.1	0	9 AM - FUEL ASHED,
10:00	2075	8586.6	13.0	13.0	419	–	435	79	–	106	101	119	1.3	0.09	0.58	–	–	–	–				11.2	7.8	0	BLOW SOOT, ADD LOAD
10:30		8590.5	12.5	11.5	413	–	500	79	40	109	99	119	1.5	0.07	0.61	–	–	–	–				10.4	8.8	0	10:30 START TEST
11:00		8594.6	13.0	13.0	419	–	435	79	–	109	99	119	1.4	0.12	0.59	–	–	–	–				9.9	9.6	0	11:00 RAKE FIRE
11:30	2065	8598.7	15.0	20.0	419	–	434	79	41	109	99	119	1.4	0.12	0.60	–	–	–	–				10.9	7.5	0	11:28 RAKE FIRE
12:00		8598.3	14.5	13.0	413	–	445	75	–	109	103	115	1.0	0.12	0.36	–	–	–	–				12.5	6.3	0	
PM 12:30	2060	8591.2	12.0	15.0	413	–	450	75	43	111	107	115	1.9	0.12	0.45	–	–	–	–				13.1	5.5	0	STACK CLEAR TO
1:00		8599.9	13.5	12.5	418	–	470	75	–	106	103	119	1.6	0.12	0.52	–	–	–	–				10.6	8.5	0	SLIGHT HAZE
1:30	2075	8597.3	12.0	12.0	419	–	472	79	42	106	103	119	1.5	0.11	0.54	–	–	–	–				10.8	8.1	0	
2:00		8550.5	12.5	11.5	419	–	435	78	–	105	101	115	1.0	0.08	0.60	–	–	–	–				10.9	8.8	0	LEVEL COAL HOPPER
2:30	2070	8551.0	16.0	18.0	419	–	482	79	45	106	103	119	1.9	0.10	0.55	–	–	–	–				8.9	10.4	0	2:30 PM ADD SIDE FIR
3:30	1995	8556.4	18.0	17.0	419		480	79	–	109	109	119	1.1	0.11	0.50	–	–	–	–				10.1	9.1	0	
																										WEATHER - CLEAR
AVE.		–	–	–	–		–	79	–	109	103	119	–	–	–								10.8	8.2	0	MAX TEMP - 45°F
	COAL TO WEIGH HOPPER			–	11,200 LB																					MIN TEMP - 29°F
	COAL SAMPLES				- 145																					
	COAL ASHED				11,055 LB																					

SECTION 7.0

SITE L7 DATA

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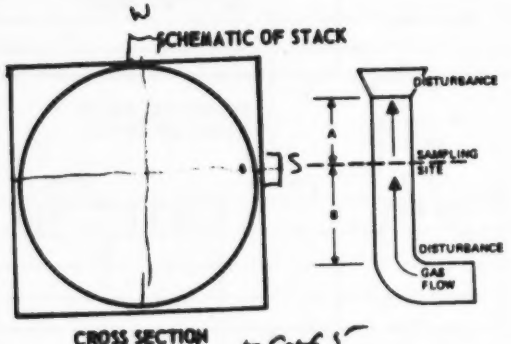
PARTICULATE FIELD DATA



Start 0845

PLANT L-7
DATE 12/13/78
LOCATION Roof-Stub
OPERATOR Davis - And
STACK NO. Boiler # 5
RUN NO. Certification
SAMPLE BOX NO. -1
METER BOX NO. CAES

AMBIENT TEMPERATURE 38
BAROMETRIC PRESSURE 29.03
ASSUMED MOISTURE, % 5
PROBE LENGTH, in. 60
NOZZLE DIAMETER, in. 1/4
STACK DIAMETER, in. 46
PROBE HEATER SETTING Full
HEATER BOX SETTING 250

METER $\Delta H_@$ 1.89
C FACTOR .81
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

1/2

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (Tm_{IN}), °F	OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
31	6 min	-.07	462	.32		.69	.69	72.20	47		200	36	2.5	
2	"	"	519	.35		.80	.80	—	47		200	36	2.5	
3	"	"	533	.40		.90	.90	—	46		200	36	3.0	
4	"	"	540	.48		1.1	1.1	—	48		200	37	3.5	
5	"	"	548	.53		1.2	1.2	—	48		200	37	3.5	
6	"	"	547	.55		1.25	1.25	—	50		200	38	3.0	
7	"	"	538	.50		1.1	1.1	93.3	50		200	38	3.5	
8	"	"	534	.42		.93	.93	96.15	50		210	39	3.0	
9	"	"	536	.42		.93	.93	98.80	50		212	38	3.0	
10	"	"	535	.40		.90	.91	101.50	50		214	39	3.0	
11	"	"	535	.39		.89	.89	—	49		216	40	3.0	
12	"	"	536	.37		.82	.82	106.20	50		219	40	3.0	
								109.01						
TOTAL	60		637		7.820									
AVERAGE		-.07												

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

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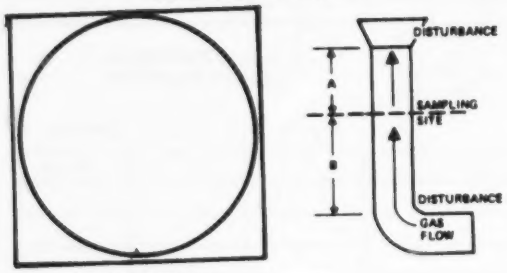
Hi Winds Leak Test Stop .019 c @ 15" Hg 8/2

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

Stop 1055

PLANT L-7
DATE 12/13/78
LOCATION Roof Stack Stack
OPERATOR Davis - Anderson
STACK NO. Boiler #5
RUN NO. Certification
SAMPLE BOX NO. RAC
METER BOX NO. CAES

AMBIENT TEMPERATURE 38
BAROMETRIC PRESSURE 29.03
ASSUMED MOISTURE, % 5%
PROBE LENGTH, in. 60"
NOZZLE DIAMETER, in. 1/4"
STACK DIAMETER, in. 46"
PROBE HEATER SETTING Full
HEATER BOX SETTING 300

METER $\Delta H_@$ 1.89
C FACTOR .81
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
W-1	5 min	-.07	494	.33		.69	.69	109.01	48		198	89	2.8	
2	"	"	524	.38		.85	.85	111.3	48		200	41	3.2	
3	"	"	536	.35		.75	.75	—	48		200	42	3.0	
4	"	"	526	.39		.88	.88	116.2	50		208	42	3.5	
5	"	"	556	.45		1.0	1.0	118.7	50		212	43	3.5	
6	"	"	548	.45		1.0	1.0	121.	50		213	44	3.5	
7	"	"	580	.40		.9	.9	—	50		223	45	3.0	
8	"	"	547	.32		.73	.73	—	51		230	46	3.0	
9	"	"	549	.33		.73	.73	129.3	51		230	47	3.0	
10	"	"	543	.35		.75	.75	—	50		230	47	3.0	
11	"	"	541	.38		.85	.85	134.1	50		233	46	3.0	
12	"	"	520	.30		.69	.69	136.6	50		233	47	3.0	
								138.835						
					7.3 12	9.83								
TOTAL	120		12803		15.1329		21.34	61.635	1181		5078	983	74.5	
AVERAGE		-.07	533		.6305		.889		49		212	41	3.1	

.398

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:

PARTICULATE LAB WORKSHEET

Site Desig. L7 Date Dec 13,78

Sample Loc. _____

	beaker #	final wt (gm)	initial wt (gm)	Δ wt (gm)
Impinger catch and H_2O rinse after filter (water sol. only)	T-1	101.1167	101.0142	.1025
	T-2	99.7957	99.6761	.1196
	____	____	____	____
H_2O rinse before filter (water sol. only)	T-3	88.7808	88.7409	.0399
	____	____	____	____
Acetone rinse after filter	T-4	91.7115	91.7065	.0050
Acetone rinse before filter	T-5	92.3526	92.3223	.0303
	Filter #			
Impinger catch and H_2O rinse after filter (water insol. only)	51-.8	.07790	.07790	0
	56-.45	.09150	.09150	0
	69-.22	.10671	.10671	0
H_2O rinse before filter (water insol. only)	50-.8	.19395	.07746	.11649
	55-.45	.09085	.09085	0
	70-.22	.10405	.10405	0
Test Filter	119	.93875	.67277	.26598
			TOTAL MASS	.67977

Dry Gas Meter Vol. (ft^3)
Final 138.835
Initial 77.20
Δ DgV 61.635

Imp. Water Vol. (Ml.)

1	2	3	4
134	103	1	213.3
100	100	0	200
34	3	1	13.3
	Total H_2O		51.3

IMPACTOR DATA SHEET

Site Desig. L7 Date Dec 12, 78

Sample Location After Collector Sample No. _____

P_b 29.35 Assmd Moisture 4% Noz. Dia. 3/16"

Stk. Dia 46" Sample Point _____ Sample Time 45 MIN

Stat P -.07 "H_2O Pitot Tube ΔP .43 "H_2O Stk T 510°F

ΔH Orfice 2.43 "H_2O Liquid Col. 31.8 ml Sample Vol. 35.76 scf

D_p	Net Wt. (milligm)	Percent
125	4.0	3.44
60	1.09	.94
45	0	0
30	0	0
14.91	12.98	11.16
9.76	13.59	11.68
6.04	16.13	13.87
4.06	11.52	9.90
2.74	11.42	9.82
1.72	7.87	6.77
.81	8.08	6.95
.45	8.60	7.39
.26	21.06	18.10
Total	116.34 Milligrms	

IMPACTOR DATA SHEET

Site Desig. L7 Date Dec 13,78

Sample Location Before Collector Sample No. _____

P_b 28.93" Hg Assmd Moisture 3% Noz. Dia. 3/8"

Stk. Dia 24"-120" Sample Point _____ Sample Time 45 MIN

Stat P -.88" H_2O Pitot Tube ΔP .15 " H_2O Stk T 600 °F

ΔH Orfice 1.65" H_2O Liquid Col. 18 ml Sample Vol. 28.5 scf

D_p	Net Wt. (milligm)	Percent
125	29.56	10.73
60	80.64	29.27
45	5.44	1.97
30	5.0	1.82
16.40	27.27	9.90
10.74	28.27	10.26
6.64	26.06	9.46
4.47	16.59	6.00
3.01	12.15	4.41
1.89	6.97	2.53
.89	9.66	3.51
.499	8.74	3.17
.292	19.24	6.98
Total	275.54 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L7 Date Dec 12, 78

Sample Location After Collector Sample No. _____

P_b 29.35 Assmd Moisture 5% Noz. Dia. 3/8"

Stk. Dia 46" Sample Point _____ Sample Time 120 M. N

Stat P -.07 "H_2O Pitot Tube ΔP .36 "H_2O Stk T 511 °F

ΔH Orfice 2.32 "H_2O Liquid Col. 68.5 ml Sample Vol. _____ scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	_____	_____	41.69	31.17
60	_____	_____	18.67	13.96
45	_____	_____	7.4	5.53
12.7	_____	_____	3.3	2.47
6.8	_____	_____	11.2	8.37
3.84	_____	_____	7.3	5.46
2.48	_____	_____	44.2	33.04
		Total	133.76 Milligrms	

BAHCO SIZE DATA SHEET

Site Desig. L7 Date Dec 13,78

Sample Location Before Collector Sample No. _____

P_b 28.95 Assmd Moisture 5% Noz. Dia. 3/8"

Stk. Dia 12"-120" Sample Point _____ Sample Time 80 MIN

Stat P -.88 "H_2O Pitot Tube ΔP .187 "H_2O Stk T 600 °F

ΔH Orfice 2.18 "H_2O Liquid Col. 23 ml Sample Vol. _____ scf

D_p	Initial Wt. (grams)	Final Wt. (grams)	Net Wt. (milligm)	Percent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
125	_____	_____	208.50	42.70
60	_____	_____	87.46	17.91
45	_____	_____	25.5	5.22
34.53	_____	_____	12.1	2.48
27.01	_____	_____	31.3	6.41
18.73	_____	_____	26.9	5.51
12.7	_____	_____	20.8	4.26
6.8	_____	_____	19.1	2.91
3.84	_____	_____	26.1	5.35
2.48	_____	_____	30.5	6.25
		Total	488.26 Milligrms	

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____

LOCATION Site L-7

DATE DECEMBER 16, 1978

~~PROJECT NO. G.S.A.~~ _____

BOILER NO. 5

DURATION OF TEST _____

FACTORS

INTEGRATOR x 600

CHART x 1000 @ 150 PSIG

TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART Flow	STEAM FLOW INTEGRATOR CHART Totals	SUPER HEAT TEMP. Air Flow	FEED WATER TEMP. @ ECON. IN	FEED WATER TEMP. @ ECON. OUT	FLUE GAS TEMP. ECON OUT	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES H.P.R.	F. W. PRESS.	WIND BOX	ZONE 2 Front +	ZONE 2 Rear −	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. DIFF IN	DUST COLL. OUT	STACK DE N. R.	Boiler CO_2	Boiler O_2	Boiler CO	REMARKS
													+	−	−						−					9:30 AM Pull Ashes
	STACK TRAVERSE / PARTICULATE SIZE TESTS																									Blow Tubes
AM 10:00	–	30.0	152982	96.0	227	–	610	66	–	148	199	125	2.9	0.05	0.80	–	–	–	–	2.0	3.0	–	8.5	10.9	0	
10:30	–	28.0	152509	92.0	227	–	570	67	–	152	158	125	1.8	0.16	0.80	–	–	–	–	0.80	4.0	–	8.8	10.5	0	Trouble with Air
11:00	–	29.0	152533	99.0	227	–	600	67	–	142	192	125	2.5	0	0.84	–	–	–	–	2.8	3.0	–	7.1	10.4	0	Flow control. Air
11:30	–	28.0	152559	30.0	227	–	510	67	–	143	143	125	1.9	0.05	0.90	–	–	–	–	2.9	3.9	–	9.9	9.7	0	and Fuel on Manual.
12:00	–	28.0	152585	99.0	227	–	562	66	–	142	192	170	1.9	0.07	0.80	–	–	–	–	2.3	3.4	–	10.8	8.5	0	Outlet Damper Adj.
12:30	–	28.0	152605	99.0	226	–	590	66	–	145	145	170	1.8	0.15	0.80	–	–	–	–	2.9	3.9	–	6.0	12.8	0	
PM 1:00	–	28.0	152630	98.0	226	–	615	69	–	148	148	170	2.1	0.09	0.85	–	–	–	–	2.8	3.7	–	7.1	12.5	0	No. 4 Boiler Banked
1:30	–	32.0	152655	99.0	225	–	610	69	–	134	132	170	2.6	0.10	0.75	–	–	–	–	2.0	2.6	–	7.2	12.6	0	1:00 Forced Safety
2:00	–	28.0	152677	98.0	226	–	570	69	–	150	191	172	1.5	0.16	0.75	–	–	–	–	2.6	3.5	–	7.0	12.7	0	Valve
2:30	–	27.0	152703	95.0	226	–	585	65	–	150	150	173	1.8	0.25	0.90	–	–	–	–	2.9	3.9	–	7.1	12.6	0	11:30 Banked Fuel Adj.
3:00	–	27.5	152723	92.0	227	–	560	65	–	150	150	175	1.8	0.03	0.85	–	–	–	–	1.8	2.9	–	8.4	11.0	0	2:00 PM Banked Fuel Adj.
3:30	–	27.0	152747	90.0	226	–	550	69	–	150	192	170	1.3	0.18	0.70	–	–	–	–							
																				–	–		8.2	11.3	0	Stack Clear
AVG	–	–	–	–	226	–	–	65	–	146	145	173	–	–	–											

DATA SHEET
BOILER SYSTEM TEST

INSTITUTION _____
LOCATION Site L-7
DATE DECEMBER 13 1978
~~PROJECT NO. 6.3A~~ _____
BOILER NO. 5
DURATION OF TEST _____

FACTORS
INTEGRATOR x 500
CHART x 1000 @ 150 PHG

	TIME	COAL WEIGHT	STEAM FLOW INTEGRATOR CHART From / Inits		SUPER HEAT TEMP. Aiea	FEED WATER TEMP. @ ECON IN	FEED WATER TEMP. @ ECON OUT	FLUE GAS TEMP. ECON OUT	COMB. AIR TEMP.	SAT. STM. COND. M M	PRESSURES DRUM	PRESSURES HPR.	F. W. PRESS.	WIND BOX	ZONE 1 From	ZONE 2 West	ZONE 3	ZONE 4	ZONE 5	FURN.	DUST COLL. Diff in	DUST COLL. OUT	STACK DE N. R.	B & A. CO$_2$	B & A. O$_2$	B & A. CO	REMARKS
			PARTICULATE EMISSION / PARTICULATE SIZE TEST											↑	—	—										7:00 AM PULL ASH
AM	8:00	1370	29.0	153397	42.0	226	—	585	68	—	150	197	170	2.1	0.10	0.70	—	—	—	—	2.2	3.0	—	8.9	10.9	0	BLOW TUBES
	8:30		31.5	153425	42.0	226	—	580	70	—	150	197	170	2.0	0.11	0.70	—	—	—	—	1.8	2.5	—	8.9	11.0	0	8:00 COAL STOKER
	9:00		32.0	153458	42.0	226	—	615	71	—	148	145	167	2.2	0.05	0.90	—	—	—	—	2.7	3.8	—	8.9	11.0	0	HOPPER
	9:30	1390	31.5	153492	42.0	226	—	600	71	—	130	130	175	2.5	0.45	0.75	—	—	—	—	2.8	3.8	—	8.6	12.0	0	10:00 RAKE PULL ASH
	10:00		31.0	153526	40.0	226	—	600	71	—	150	150	173	2.1	0.06	0.65	—	—	—	—	2.3	3.2	—	8.2	11.3	0	11:15 LOWER ASHES
	10:30		29.0	153559	45.0	226	—	610	71	—	148	145	170	2.0	0.11	0.90	—	—	—	—	2.0	3.8	—	8.8	10.5	0	HOPPER
	11:00	1390	31.5	153565	40.0	226	—	600	71	—	150	150	176	1.7	0.26	0.80	—	—	—	—	1.7	3.7	—	8.2	11.3	0	1:00 PM RAKE ASHES
	11:30		25.5	153581	30.0	226	—	560	71	—	155	155	171	0	0.36	0.33	—	—	—	—	1.8	2.7	—	8.1	11.9	0	3:00 RAKE ASHES
	12:00	1370	23.5	153599	35.0	226	—	540	71	—	156	156	175	1.1	0.23	0.55	—	—	—	—	1.3	2.0	—	7.8	11.7	0	
PM	12:30		30.0	153626	45.0	227	—	570	72	—	145	143	173	1.7	0.05	0.80	—	—	—	—	2.6	3.6	—	7.1	11.9	0	STACK CLEAR
	1:00	1780	23.5	153692	42.0	226	—	560	71	—	151	150	173	1.5	0.22	0.65	—	—	—	—	2.9	3.8	—	6.6	13.1	0	
	1:30		22.5	153667	42.0	226	—	510	71	—	150	148	173	1.6	0.13	0.60	—	—	—	—	1.0	1.7	—	7.9	11.6	0	
	2:00		22.5	153699	35.0	225	—	590	70	—	150	150	173	1.0	0.29	0.55	—	—	—	—	0.9	2.5	—	6.6	13.1	0	
	2:30	1790	24.0	153730	36.0	226	—	510	69	—	155	153	175	1.0	0.25	0.55	—	—	—	—	1.9	2.8	—	8.8	10.5	0	
	3:00		25.0	153783	38.0	225	—	575	66	—	153	153	170	1.3	0.29	0.65	—	—	—	—	1.5	2.5	—	7.9	12.9	0	
	3:30	1790	23.0	153792	37.0	226	—	570	67	—	153	152	170	1.1	0.17	0.55	—	—	—	—	1.2	1.9	—	8.6	10.8	0	
	AVG.		—	—	—	226	—	—	70	—	149	148	172	—	—	—	—	—	—	—	—	—	—	8.0	11.6	0	
		COAL, WELSH LARRY				18750	LB			FLY ASH FROM COLLECTOR - 69 LB																	
		COAL SAMPLES				—	10L																				
		COAL AVAILD				10695	LB																				
		LEAN TO 11:15 AM																									